ELECTRONICS FIELD CHANGE BULLETIN No. 7-AN/TPS-1D

BUREAU OF SHIPS, NAVY DEPARTMENT
WASHINGTON, D.C.

Prepared by
Raytheon Manufacturing Company
Waltham, Mass.

Contracts: NObsr-43457
NObsr-49254
NObsr-52404
NObsr-57464
NObsr-63471

FIELD CHANGE NUMBER 7-AN/TPS-1D

Applicable to
RADIO SET AN/TPS-1D

Local Oscillator Improvement and Automatic Frequency Control Deletion

Standard Navy Stock Number F16-M-304502-340

FSN 5840-311-3269

Equipment Affected: Radar Receiver-Transmitter RT-212/TPS-1D, Power Supply PP-674/TPS-1D, and Azimuth-Range Indicator IP-141/TPS-1D in all equipments bearing system serial numbers 2 through 734.

Purpose:

(1) To remove AFC from the system and make changes in Local Oscillator and associated circuits to provide improved MTI operation.

(2) Before installing this Field Change, the following changes must be accomplished in the respective equipments:

(a) Raytheon Change 1 (Duplexer Cavity) in serial numbers 4 through 42, excluding 7, in which RF Assembly RF503 and two associated cables are replaced.

(b) Raytheon Change 2 (Local Oscillator Tube Replacement, Type 2C40 in lieu of 5650) in serial numbers 2 through 147.

(c) Navy Field Change 5-AN/TPS-1D (Duplexer Tube Replacement Type 6322 in lieu of 1B27) in serial numbers 2 through 733.

(d) Navy Field Change 6-AN/TPS-1D (Relocation of R403) serial numbers 2 through 734.

THIS FIELD CHANGE IS EQUIVALENT TO A REPAIR, AND SHOULD BE ACCOMPLISHED AT THE EARLIEST OPPORTUNITY BY MAINTENANCE PERSONNEL OF THE ACTIVITY OR VESSEL TO WHICH THE AFFECTED EQUIPMENT IS ASSIGNED.

Time Required:

Approximately 40 man-hours

Material Required (Supplied with Field Change):

(See pages 23 and 24)

Material Required (To Be Supplied by Installing Activity):

1 Soldering iron
1 Pliers, long nose
1 Cutter, diagonal (6")
1 Volt-ohmmeter
1 Technician's tool kit, containing normal complement of tools, etc.
1 Power drill (1/4" chuck)

SERVICING PERSONNEL MUST, AT ALL TIMES, OBSERVE ALL SAFETY REGULATIONS. DO NOT MAKE ANY FIELD CHANGES TO EQUIPMENT WITH HIGH-VOLTAGE SUPPLY ON. UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN CIRCUITS WITH POWER CONTROLS IN THE "OFF" POSITION DUE TO CHARGES RETAINED BY CAPACITORS. TO AVOID CASUALTIES, ALWAYS REMOVE POWER AND GROUND THE CIRCUITS PRIOR TO TOUCHING THEM.

PART AFFECTED	LOCATION	PROCEDURE
AZIMUTH-RANGE INDICATOR PROCEDURE		
1. AFC-Manual Switch S614	1. Front panel (See figures 1 and 2)	1.(a) Remove the Azimuth-Range Indicator chassis from the unit case and place on work bench with top side down.
		(b) Disconnect lead to terminal 2 of jack J601 (other end of this lead is connected to the arm of switch S613B — by a continuity test, confirm this.)
		(c) Cut back to the harness both ends of the above lead.
		(d) Remove the jumper lead between the INCREASE terminals of S613A/B.
		(e) Remove the jumper lead between the INCREASE and DECREASE terminals of S613B. (See figures 3 and 4.)
		(f) Disconnect all leads connected to switch S614.
		(g) Determine, by a continuity check, the lead connected between terminal 1 of J601 to S614, and solder this lead to the INCREASE terminal of S613A.
		(h) Disconnect and cut back to the harness the lead connected to the DECREASE terminal of S613B.
		(i) Remove S614 and install the provided washers and hardware (tags 1, 2, 3, and 4) to cover the hole. Use black lacquer (tag 53) and brush (tag 60) to obliterate the AFC-MANUAL marking on the control panel.

PART AFFECTED	LOCATION	PROCEDURE

AZIMUTH-RANGE INDICATOR PROCEDURE (Cont.)

2. Identification Warning Plate	2. Front panel	2. Replace the red Warning Plate on the front panel with the new plate (tag 5). Note One complete spare set of Warning plate mounting hardware (tags 6, 7, 8, and 9) is provided to replace lost hardware. However, the original hardware is to be used if possible.
3. INC-DEC Tuning	3. Front panel	3.(a) Remove the INC-DEC control knob and the shaft securing nut. Note Push shaft of switch S613, S613A/B back through front panel. Using drill (tag 62), drill a hole 1/8" deep to the left of the shaft hole of S613A/B. This is the non-rotate hole for the knob lock. (b) Install gasket (tag 10) and lock (tag 11), and reinstall the securing nut and control knob.

PART AFFECTED	LOCATION	PROCEDURE
AZIMUTH-RANGE INDICATOR PROCEDURE (Cont.)		
4. Antenna Speed Control Detent Assembly	4. Antenna Speed Control Assembly	4.(a) Remove the detent plunger assembly, including bracket (see figure 5), from the antenna speed control assembly and replace with the new type (tags 12, 13, 14, and 15). Note Operate the control both clockwise and counter-clockwise, and adjust spring cartridge and lock nut if binding or loose action is experienced. (b) Install and secure the Azimuth-Range Indicator in its case.
POWER SUPPLY PROCEDURE		
1. V418	1. Main Chassis (See figures 6, 7, 8, 9, and 10)	1.(a) Remove power supply from unit case. Disconnect leads from power supply chassis to terminal boards E401, E403, and E404. Remove the mechanical stops. Remove the power supply chassis by loosening the four captive retaining screws. (b) Disconnect and remove R436 (figure 9). (c) Disconnect the lead to terminal 8 of XV418 and cut back to the harness. (d) Disconnect and cut back to the harness the red lead on the positive terminal of C402 that connects to 3A on E401.

PART AFFECTED	LOCATION	PROCEDURE

POWER SUPPLY PROCEDURE (Cont.)

(e) Disconnect both leads to terminal 3A on E401, and cut back to the harness.

(f) Disconnect and discard the lead between terminal 5 of XV418 and the stand-off terminal, S.O.#6.

(g) Disconnect and discard the lead between S,O.#6 and the arm of potentie-ometer R430.

(h) Remove and discard resistor R429 which is connected between S.O.#23 and the CW terminal of R430.

(i) Disconnect and discard the lead between the CCW terminal of R430 and S.O.#27.

(j) Remove and discard R430. Remove R430 identifica-tion marking on both sides of chassis.

(k) Install the supplied stand-off insulated terminal (tag 20) in the anti-rotate hole of R430, and secure with nut (tag 27) and flat washer (tag 28).

(l) Install a lead (tag 21) between S.O.#27 and the positive terminal of C402.

PART AFFECTED	LOCATION	PROCEDURE

POWER SUPPLY PROCEDURE (Cont.)

(m) Install the new R429 (tag 22) between S.O.#23 and the new stand-off terminal.

(n) Install new resistor R462 (tag 23) between the new stand-off terminal and S.O.#27.

(o) Remove V418 from its socket.

(p) Remove XV418 securing hardware, and pull back socket and remaining connected leads.

(q) Install the provided insulated stand-off terminals (tag 20) in each of the socket mounting holes.

(r) Disconnect the two leads to pin 7 of XV418, and solder to the right-hand insulated terminal.

(s) Disconnect the two leads to pin 2 of XV418, and solder to the left-hand insulated terminal.

(t) Disconnect the two leads from pin 4 of XV418. Determine which lead is connected to the positive terminal of C406, and solder this lead to pin 6 of XV416. Remove and discard the remaining lead that was connected to pin 4.

(u) Discard XV418, and remove XV418 and V418 identification markings.

PART AFFECTED	LOCATION	PROCEDURE
	POWER SUPPLY PROCEDURE (Cont.)	
2. AFC Chassis	2. Under Main Chassis (See figure 8)	2. Remove the AFC Amplifier Assembly, Z1428, and the Capacitor Assembly, Z1424.
3. Transformer T404	3. Rear of Unit Chassis	3.(a) Disconnect the lead from terminal 2 of T404.
		Note The other end of the lead to terminal 2 of T404 is one of the four leads tied to one end of F403. All four leads must be disconnected, and a continuity check made to determine which lead connects to terminal 2 of T404. When both ends of this lead are determined, cut both ends back to the harness. Reconnect the remaining 3 leads to the terminal of F403.
		(b) Disconnect the lead to terminal 1 of T404. Disconnect the two leads connected to terminal 302 of board E405. Determine, by a continuity check, the lead at E405 that was connected to terminal 1 of T404. Cut both ends of this lead back to the harness. Reconnect the remaining lead back to terminal 302 of board E405.

PART AFFECTED	LOCATION	PROCEDURE
		POWER SUPPLY PROCEDURE (Cont.)
		(c) Disconnect lead to terminal 4 of T404, and cut back to the harness.
		(d) Disconnect the lead from terminal 3 of T404, and cut back to the harness.
		(e) Remove T404 and its mounting bracket, and discard.
		(f) Remove T404 identification markings.
4. P433, P432 J421, J407, and J408		4.(a) Disconnect and discard P432, and cut the lead back to the harness.
		(b) Cut back to the harness all leads connected to P433, and discard P433.
		(c) Disconnect and cut back to the harness the lead to J421.
		(d) Remove J421 and discard. Using provided plate (tag 24), cover J421 hole and eliminate J421 marking on the panel with black lacquer.
		(e) Locate J408, and disconnect and cut back to the harness the leads to terminals d, S, and L.
		Note Terminal d is near the center of jack and is not to be confused with terminal P, which is near the outside of the jack.

PART AFFECTED	LOCATION	PROCEDURE
POWER SUPPLY PROCEDURE (Cont.)		
		(f) Locate J407, disconnect the lead to terminal 2 and cut back to the harness.
5. Warning Plate (tag 25)		5. Replace Warning Plate on front panel with new one (tag 25).
6. Reinstallation of Main Chassis		6.(a) Reinstall and secure power supply chassis, and connect leads to E401, E403, and E404.
		(b) Reinstall mechanical stops.
		(c) Reinstall and secure power supply in its unit case.
RECEIVER-TRANSMITTER PROCEDURE		
1. Local Oscillator Assembly	1.Lower Chassis (See figures 11 and 20)	1.(a) Remove chassis from unit case and place on work bench.
		(b) Disconnect all wires connected to stand-off insulated terminals A, B, C, and D near tuning motor B503. Remove Local Oscillator Assembly and place on work bench.
		(c) Cut back to the harnessing all the main cable leads that were connected to the above terminals.

PART AFFECTED	LOCATION	PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

(d) Disconnect and cut back to the harness all the leads connected to switches S507 and S508.

(e) Remove Local Oscillator tube V505, and pull the socket, XV505, back to one side.

(f) Decouple the motor, B503, shaft from the AFC paddle shaft by removing the setscrews in the coupling, using hex wrench (tag 57) and the cotter pin in the spring retainer (see figure 11).

(g) Remove the 4 bolts securing the bracket upon which B503, S507, and S508 are mounted, and remove the entire assembly.

(h) Remove the 4 insulated stand-off terminals, A, B, C, and D.

(i) Remove the two bolts and hardware which secure the bracket upon which are mounted K502, K503, C525, R528, R529, and R534.

(j) Disconnect and cut back to the harness the lead between the bottom terminal of R518 and terminal 6 of K502.

PART AFFECTED	LOCATION	PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

(k) Disconnect all main cable leads to the harnessing.

(l) Disconnect and cut back to the harness the black lead connected to the top terminal of R519.

(m) Replace resistors R518 and R519 with supplied resistors (tag 30), and secure with supplied screws (tag 53) and the hardware used in securing the old resistors.

Note

Before remounting and securing R518, relocate its mounting hole 1/2" closer to R519. Drill (tag 59) is supplied for this change.

(n) Remove the bracket assembly upon which K502, K503, and C525 are mounted.

(o) Cut back to the harnessing the leads from the local oscillator main cable that connect to the following terminals on terminal board E502: 3A, 3A1, 302, 1303, and 8A12.

PART AFFECTED	LOCATION	PROCEDURE
		RECEIVER-TRANSMITTER PROCEDURE (Cont.)
		(p) Install 12" lead (tag 31) between the top (open) terminal of R519 and the ground (black-wire) terminal of C534. Note In equipments serial numbered 148 through 279, capacitors C534, C535 and resistor R535 have not been incorporated, therefore, if there is no C534 (see figure 13), connect the wire to the ground terminal near the socket end plate of the assembly (see figure 13.).
2. Tuning Motor B502	2. Plate end of Local Oscillator Assembly (see figures 12, 13, 14, 15, 16, 17, and 18)	2.(a) Note or mark the position of the gear box in relation to the mounting bracket. (Outline the base plate with pencil.) Note The gear box must be mounted so the shaft is located as pictured in figure 17.
		(b) Remove the 4 bolts and hardware securing the bracket upon which the tuning motor and gear box are mounted.
		(c) Note the position of the actuating arm of B502 and the area over which it travels, and then remove.
		(d) Remove the motor from the gear case by removing the 4 securing screws.

PART AFFECTED	LOCATION	PROCEDURE
	RECEIVER-TRANSMITTER PROCEDURE (Cont.)	
		(e) Remove gear case and replace new gear case (tag 32) in same position.
		(f) Secure motor to gear case.
		CAUTION Do not force the motor on the gear case. Damage to the gears may result if the motor shaft gear and the gear case drive gear are not properly aligned and engaged.
		(g) Reverse the red and white motor leads on the stand-off terminals.
		(h) Paint over the 1.125-rpm marking on the motor.
		(i) Reinstall the actuating arm on the gear shaft in the position noted in step (c).
3. Local Oscillator Cavity Assembly	3. Local Oscillator Assembly	3.(a) Remove the three nuts and hardware securing the socket end plate to the tie rods.
		Note Before removing the socket end plate or moving the outer cylinder of the cavity, mark their positions in respect to the top tie rod. Note that a rivet head aligns directly beneath the top tie rod when the pick-up loop setscrew is on the

PART AFFECTED | LOCATION | PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

left side of the assembly. When the socket end plate is removed, align it correctly with the new end plate. Place a corresponding alignment mark on the new plate (see figure 16).

(b) Remove the socket end plate by carefully withdrawing it from the outer cylinder and from the AFC paddle shaft.

(c) Remove the outer shell of the cavity, and from it remove the AFC paddle.

(d) Release the setscrew (see figure 16) securing the pick-up loop (see figure 14), using hexagonal wrench (tag 57).

Note

The new loop (tag 33) assembly mounts in the same position (the radial section of the large loop is mounted toward the center of the cavity), and approximately 1/16" clearance is maintained between the bottom of the loop and the plate (see figure 14).

(e) Disconnect the B+ lead. Remove the nut and washers securing the inner cavity cylinder (see figure 17).

PART AFFECTED LOCATION PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

Note

When withdrawing the inner assembly (see figures 12 and 13), care must be exercised in order not to damage or break the sheet-mica capacitor (C531). The mica capacitor is separated from the outer cylinder by a corrugated-sheet spring. When withdrawing the inner cylinder, pull the inner cylinder and the capacitor out 1-1/2"; then, from the rear, push the sheet spring out and over the capacitor. Secure the exposed portions of the capacitor and spring with a rubber band (tag 63) (see figure 12). Withdraw the assembly an additional 3", and install another rubber band. Then withdraw almost completely, and install another rubber band near the end of the sheet spring before removing the complete assembly. If the sheet is damaged or broken during removal or reinstallation, spare capacitors (tag 34) will be found in the Field Change Kit. If a damaged capacitor must be replaced, note that the narrow unsilvered portion of the capacitor fits under the center cavity insulator ring.

PART AFFECTED LOCATION PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

(f) Remove the center cavity assembly, capacitor, and sheet spring.

(g) Remove the four bolts and hardware securing the thin plastic ring. Remove the thin ring.

(h) Remove the hardware securing the thick dielectric ring to the tuning shaft. Withdraw the thick ring.

(1) Remove the screws securing the retaining ring that fastens the nylon bushing to the thick plastic ring.

(2) Replace the bushing with the new bushing (tag 35), and secure with retaining ring and spring brackets (tag 36) as shown in figure 13.

Note

The spring brackets must fit over the two narrow slotted sections of the bushing. They must be adjusted so the bushing will slide freely over the inner cylinder when attached to the tuning shafts assembly (see figure 13).

PART AFFECTED LOCATION PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

(i) Remove the tuning shafts assembly and springs.

(j) Using a fine grade of sandpaper or a fine toothed round file, ream and remove any burrs or rough portions that may exist in the tuning shaft holes.

(k) Remove the two nuts securing the end plate to the chassis bracket.

(l) Remove the end plate.

(1) Remove the screws (see figure 15) securing the grounded ends of the pick-up loops connected to the center conductors of J517 and J518.

(2) Unsolder and remove the two pick-up loops.

(3) Remove J517 and J518, and file, using file (tag 58), the center conductor until it is but 1/8" long.

(4) Reinstall J517 and J518, and solder new loops (tag 37) thereto. Secure grounded ends of the loops with the screws removed in the first step.

Note

The new loops must lie horizontally with the end plate surface.

PART AFFECTED	LOCATION	PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

(m) Reinstall the tuning shafts assembly and secure the modified plastic ring to it (see figure 13).

Note

The spring brackets project toward the tube end of the cavity. The springs must be adjusted so that the ring and the bushing slide freely along the inner cylinder.

(n) Reinstall the ring insulator, inner cavity cylinder, sheet-mica capacitor, and sheet spring. Remove all rubber bands. Secure, with the spacer, new washer (tag 38) and nut.

Note

Check the capacitor with a volt-ohmmeter set on its highest resistance scale. The check may be made by placing the probes on the B+ terminal and the outer shell of the inner cavity. If a short or leakage exists, the capacitor (tag 34) must be replaced.

(o) Reinstall and secure the tuning motor, B502, and properly engage the roller bushing in the tuning shaft crosspieces.

PART AFFECTED LOCATION PROCEDURE

RECEIVER-TRANSMITTER PROCEDURE (Cont.)

Note

When the Local Oscillator Assembly is completely reassembled, loosen the locking screw on the actuating arm and manually rotate the arm on its shaft and adjust, if necessary, the position of the limit switches, S502 and S503, or the position of motor B502 for the proper opening and closing of the switches. Before tightening the locking screw, position the actuating arm on the gear box shaft so that the arm has proper clearance throughout its range of travel.

(p) Reinstall the outer shell of the cavity assembly and align it according to the markings made on it in step 3.(a), page 14.

(q) Reinstall and secure the new socket end plate (tag 39), and align it according to the markings described in step 3.(a), (see figure 16).

(r) Install resistor R536 (tag 43) between pins 2 and 7 of XV505.

(s) Reinstall V505 and its socket, XV505.

(t) Connect the plate lead.

(u) Install rubber bumpers (tag 40) beneath the tie rods (see figure 19) with cement (tag 61).

PART AFFECTED	LOCATION	PROCEDURE
RECEIVER-TRANSMITTER PROCEDURE (Cont.)		
4. Filter Unit Z504	4. Lower deck R/T unit back of Z505	4. Cut back to the harness the leads connected to Z504.
5. Connector J509	5. Front Panel	5.(a) Remove the coaxial cable between J520 and J509. (b) Remove J509 on the front panel. (c) Remove J509 identification plate. (d) Install plate (tag 41) to cover J509 mounting hole.
6. Leads from the unit main harnessed cable to E502		6.(a) Disconnect the leads from the main cable to terminals 3A, 3A1, 302, 1303, and 8A12 on board E502, and cut back to the harness. (b) Install supplied "SPARE" tags (tag 42) to the above terminals.
7. Front Panel		7.(a) Replace test selector plate with new one (tag 51). (b) Install new Warning Plate (tag 52).
8. Local Oscillator Assembly stow-bolt	8. See figure 17	8.(a) Remove Local Oscillator Assembly stow-bolt and replace with new bolt (tag 49), using supplied retaining rings (tag 50) to secure.
9. Magnetron Blower Motor Assembly B501	9. See figure 17	9.(a) Remove the magnetron. (b) Disconnect the leads to terminal strip E503. (c) Mark the magnetron casting where the C512 bracket bolt heads touch or are closer than 1/8". Check the clearance between the

PART AFFECTED	LOCATION	PROCEDURE
		RECEIVER-TRANSMITTER PROCEDURE(Cont.)
		blower motor flange and the magnetron casting for 1/16" clearance at all points. If less than 1/16" clearance is found, it will be necessary to file or mill down the blower motor flange until 1/16" clearance is obtained.
		(d) Remove the blower motor assembly, including B501, E503 and C512.
		(e) File the marked points on the casting until 1/8" clearance exists between the bracket mounting bolt heads and the magnetron casting. File or mill the blower motor flange, if necessary, before reinstalling.
		(f) Reinstall the blower motor assembly and reconnect leads to E503.
		(g) Reinstall the magnetron and secure.
10. Local Oscillator Assembly		10.(a) Cut or file the two hexagonal posts (see figure 13) on the drive motor end of the assembly until they are only 1-1/16" long.
		(b) Cut or file the two hexagonal posts on the tube socket end of the assembly until they are only 13/16" long.
		(c) Reinstall Local Oscillator Assembly and connect leads to board E502.
		(d) Return the main chassis to the unit case and secure.
11. RF Cable Clamps (tag 44)	11.See figure 24	11.(a) Install the RF cable clamps (tag 44), and the securing hardware (tags 45, 46, 47, and 48) on cable RF854, as shown in figure 24.

MATERIAL LIST FOR FIELD CHANGE #7

Tag No.	Qty.	Description	Raytheon Part No.
		Items for Azimuth-Range Indicator	
1	2	Washer (to cover S614 hole) 1" diam, .169 thick aluminum, center hole 0.169" diam	A1890-1001P1
2	1	Screw, Binding Head, Mach, 1" long, 8/32, SS	ZA207-1001P30
3	1	Nut, 6-32, SS	ZS203-1001P3
4	1	Washer, Lock, #6, SS	ZA236-1002P3
5	1	Plate, Identification	AJP102-17P3
6	4	Washer, Flat, #8, SS	ZA236-1113P5
7	4	Washer, Spring-lock, #8, SS	ZA236-1002P5
8	4	Nut, Hexagon, 8-32, SS	ZA203-1001P5
9	4	Screw, Binding Head, Mach, 5/16" long, 4-40, SS	ZA207-1001P3
10	1	Gasket, 11/16" diam, 1/16" thk, center hole 13/32" diam gum rubber material	A1593-1110P3
11	1	Lock, Knob, special	ZD231-1099G3
12	1	Bracket, Cartridge, 1-1/2 x 3/8 x 5/8, AS	A1593-1183P1
13	1	Plunger, Spring, 1" long, 5/16" wide	S288-1033P1
14	1	Nut, Hexagon, 5/16 – 18, SS	ZA203-1001P11
15	2	Screw, Socket HD-cap, 5/8" long, 6-32	ZB207-1020P14
		Items for Power Supply	
20	4	Terminal, Turret	ZA227-1027P2
21	26"	Wire, #22 AWG, Stranded-black	S273-1001P10
22	1	Resistor (R429) fixed, comp, 15K ohms, ±10%, 1 watt	ZS280-1002P116

Tag No.	Qty.	Description	Raytheon Part No.
		Items for Power Supply (Cont.)	
23	1	Resistor (R462) fixed, comp, 22K ohms, ±10%, 1 watt	ZS280-1002P122
24	1	Plate, Cover, 1" x 1" x 0.64", aluminum	A1890-1002P1
25	1	Plate, Identification	AJP102-17P3
26	4	Nuts, Hex, 6-32, SS	S203-1001P3
27	4	Washer, Lock, 6-32, SS	ZA236-1002P3
28	4	Washer, Flat 6-32, SS	ZA236-1113P3
		Items for Receiver-Transmitter	
30	2	Resistor (R518 and R519) fixed, WW, 28 ohms, ±5%, 12W, 2" long	S280-1007P30
31	24"	Wire, #22 AWG, Stranded black	S273-1001P10
32	1	Gear Case, 5400/0.281 reduction, 1-1/64" high, 1.645" diam	S1588-1383P1
33	1	Loop, Assy, insulated feed back 1-11/16" long	B1588-1381G1
34	2	Capacitor (C531) fixed, sheet mica mica, 0.015 mf ±50%, 300 vdcw	S1588-1327P1
35	1	Bushing, Teflon, 1.735" diam, 1" long	A1588-1379P1
36	2	Spring, beryllium copper, .015" thick, 25/32" long, 3/8" wide, securing hole .113" diam	A1588-1378P1
37	2	Lead, Electrical, 7/16" long, pick-up loop	A1588-1333P1
38	1	Washer, GMG, .062" thick, 1.061" diam , center-hole diam .170", cloth melamine laminated material	A1588-1388P1
39	1	Assembly, Paddle Plate End	C1590-5001G1
40	3	Pad, Neoprene, 1/2" X 1" X 3/16"	A1588-1380P1

Tag No.	Qty.	Description	Raytheon Part No.
		Items for Receiver-Transmitter (Cont.)	
41	1	Plate, Cover (J509)	A1890-1002P1
42	5	Label, Spare	ZA252-1017P1
43	1	Resistor, fixed, comp, 150 ohm ±10%, 1 watt, (R536)	ZS280-1002P44
44	4	Clamp, for RF854	G2048-1018P1
45	16	Nut, 8-32, SS	ZS203-1001P5
46	16	Screw, Binding Head, Mach, 7/16" long, SS, 4-40	ZA207-1001P55
47	16	Washer, Lock, #8, SS	ZA236-1002P5
48	16	Washer, Flat, #8, SS	ZA236-1113P5
49	1	Screw, Stowing, SS, 2-1/2" long, 1/4-20	A1588-1262P1
50	2	Ring, Retaining, Waldes ring #5100-25M1	ZS362-1005P7
51	1	Plate, Test Selector Ident.	A1588-1023P1
52	1	Plate, Identification	AJP102-17P3
53	2	Screws, Binding Head, Mach, 2-1/2" long, SS, 6-32	S207-1005P428
		Miscellaneous Material	
55	1	Lacquer, Black, Air-drying	S223-1080P6
56	2	Cord, Lacing	S268-1011P2
57	1	Wrench, Hex	ZS318-1002P2
58	1	File, Mill, Single-cut, Flat, 8 x 3/16 x 5/32	S318-1050P1
59	1	Drill, Twist, straight shank, size #24	S318-1009P50
60	1	Brush, camel hair, size #2	S246-1005P2
61	1	Cement, Rubber, Minn. Mine #EC870	S230-1085P5
62	1	Drill, Twist, straight shank, size #27	S318-1009P5
63	4	Rubber Bands -	

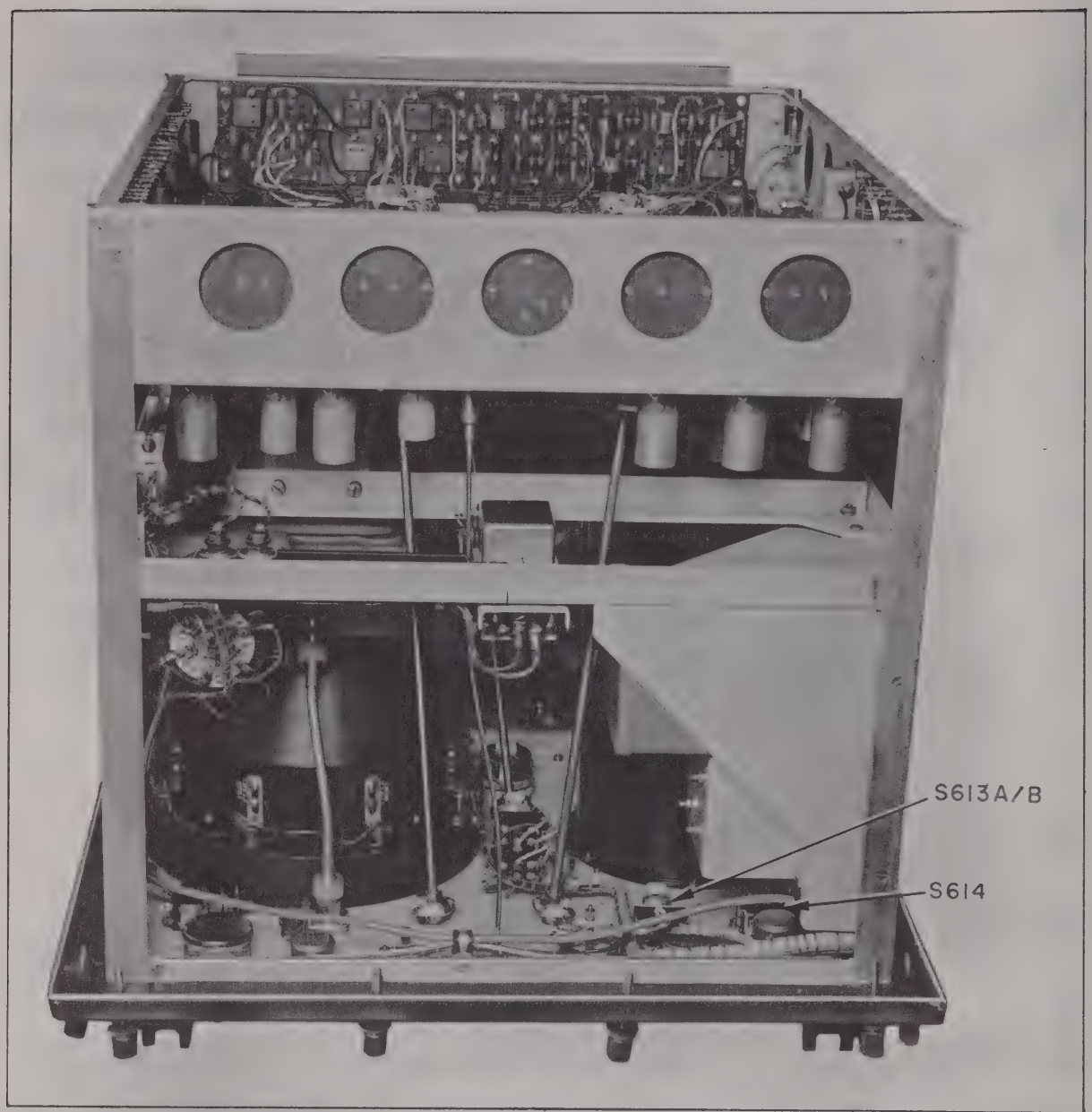


Figure 1. Azimuth-Range Indicator Component Locations

Routine Instructions

(1) Personnel making this Field Change shall record the completion of the change in the Electronic Equipment History Card NAVSHIPS 536 and the completion data on the Field Change Record Card NAVSHIPS 537.

(2) Correct the instruction books for Radio Set AN/TPS-1D NAVSHIPS 91579(B) in accordance with Change 1 and the errata sheet attached to this bulletin. Changes to the instruction book shall not be made until changes to the equipment have been accomplished.

(3) All items and material removed from the equipment by this Field Change shall be turned over to the Electronics Officer for disposal upon completion of this change.

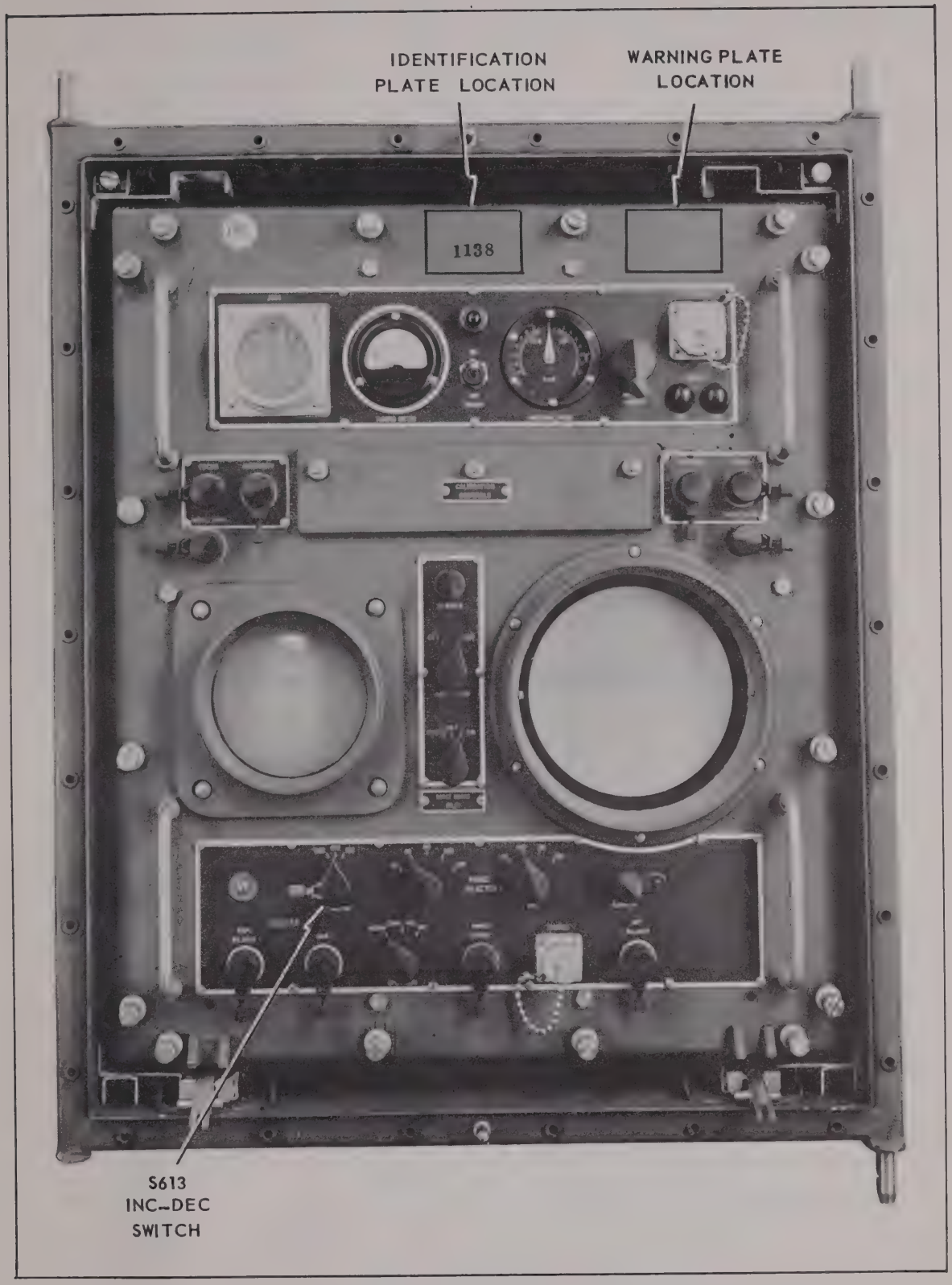
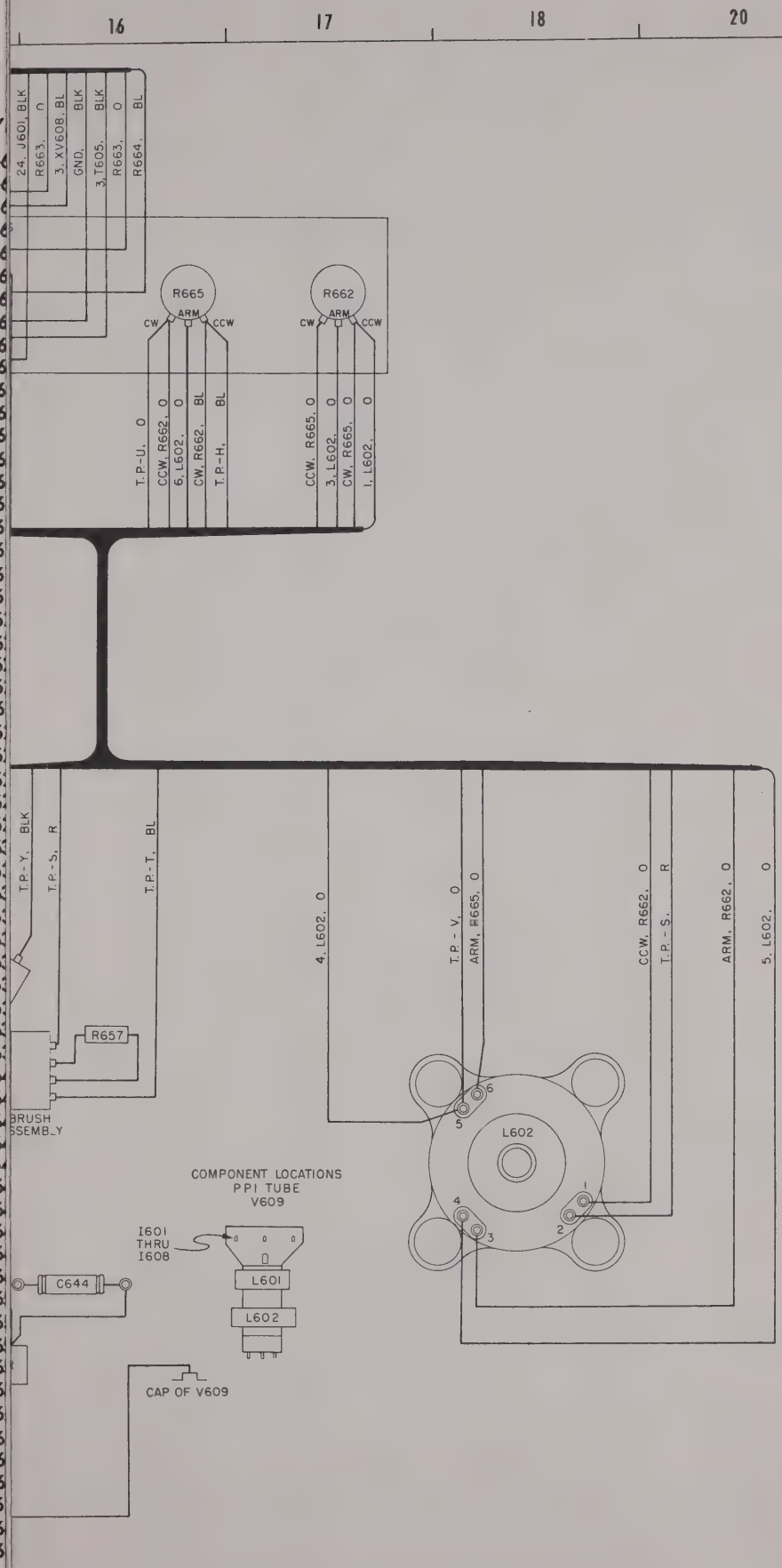


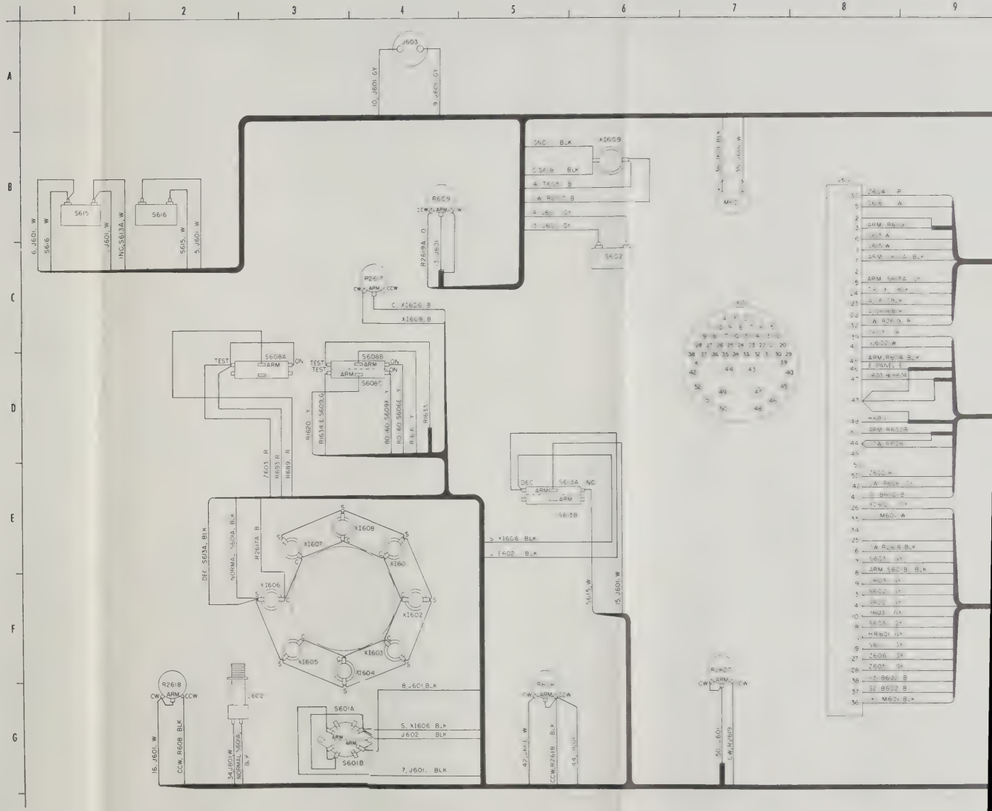
Figure 2. Azimuth-Range Indicator Front Panel



ator Practical Wiring Diagram (modified)

COMPONENT LOCATIONS

SYMBOL	VERT	HORIZ	FIG. NO.
B-601	15	F	7-108
B-602	14	F	7-108
C-601	12	B	7-108
C-602	13	B	7-108
C-604	2	D	7-107
C-605	8	A	7-107
C-606	2	E	7-107
C-607	2	D	7-107
C-608	12	G	7-108
C-609	8	H	7-107
C-610	8	D	7-107
C-611	8	D	7-107
C-612	8	D	7-107
C-613	8	D	7-107
C-614	6	H	7-107
C-615	8	E	7-107
C-616	8	E	7-107
C-617	8	E	7-107
C-618	8	E	7-107
C-619	9	C	7-107
C-620	2	F	7-107
C-621	5	H	7-107
C-622	6	H	7-107
C-623	4	G	7-106
C-624	2	B	7-107
C-625	9	H	7-107
C-626	9	H	7-107
C-627	14	B	7-106
C-628	13	B	7-106
C-629	12	B	7-106
C-630	9	A	7-107
C-631	9	F	7-106
C-632	9	B	7-106
C-633	9	B	7-106
C-634	8	B	7-106
C-635	6	B	7-106
C-636	6	B	7-106
C-637	4	B	7-106
C-638	7	B	7-106
C-639	2	D	7-107
C-640	2	C	7-107
C-641	2	C	7-107
C-642	9	B	7-107
C-643	8	H	7-107
C-644	15	F	7-108
C-645	10	H	7-107
C-646	10	H	7-107
C-647	17	E	7-107
C-648	12	D	7-107
C-649	12	D	7-107
C-650	12	D	7-107
C-651	12	D	7-107
C-652	12	D	7-107
C-653	17	E	7-107
C-654	12	E	7-107
C-655	12	E	7-107
C-656	12	E	7-107
C-657	12	E	7-107
C-658	12	E	7-107
C-659	11	B	7-107
C-660	11	B	7-107
C-661	14	D	7-107
C-662	14	A	7-107
C-664	16	B	7-107
C-665	12	E	7-108
C-666	12	E	7-108
C-667	11	G	7-108
CR-601	2	A	7-107
E-601	15	G	7-108
E-602	10	F	7-108
HR-601	13	F	7-108
J-601	8	B	7-108
J-602	2	F	7-108
L-601	15	E	7-108
L-602	17	F	7-108
L-603	2	A	7-107
L-604	10	B	7-106
M-601	7	B	7-108
R-601	11	B	7-107
R-608	5	F	7-108
R-609	4	B	7-108
R-610	8	H	7-106
R-611	2	D	7-107
R-612	2	E	7-107
R-613	2	E	7-107
R-614	2	D	7-107
R-615	2	E	7-107
R-616	2	D	7-107
R-617	2	E	7-107
R-618	2	D	7-107
R-619	7	H	7-107
R-620	6	H	7-107
R-621	6	H	7-107
R-622	6	H	7-107
R-623	7	H	7-107
R-624	7	H	7-107
R-625	7	H	7-107
R-626	6	E	7-107
R-627	8	E	7-107
R-628	7	H	7-107
R-629	7	H	7-107
R-630	7	H	7-107
R-631	7	H	7-107
R-632	7	H	7-107
R-633	6	H	7-107
R-634	8	E	7-107
R-635	5	H	7-107
R-636	6	H	7-107
R-637	5	H	7-107
R-638	5	H	7-107
R-639	2	F	7-107
R-640	2	F	7-107
R-641	2	F	7-107
R-642	5	H	7-107
R-643	5	H	7-107
R-644	2	F	7-107
R-645	2	F	7-107
R-646	2	F	7-107
R-647	2	F	7-107
R-648	2	E	7-107
R-649	2	E	7-107
R-650	2	F	7-107
R-651	9	H	7-106
R-652	7	E	7-107
R-653	7	E	7-107
R-654	7	E	7-107
R-655	7	E	7-107
R-656	6	H	7-107
R-657	16	E	7-108
R-658	6	C	7-107
R-659	5	G	7-106
R-660A	6	F	7-106
R-660B	7	F	7-106
R-661	14	B	7-106
R-662	17	B	7-108
R-663	15	D	7-108
R-664	14	E	7-108
R-665	16	B	7-108
R-666	2	E	7-107
R-667	2	E	7-107
R-668	2	E	7-107
R-669	2	E	7-107
R-670	2	E	7-107
R-671	4	H	7-106
R-672	2	A	7-107
R-673	7	C	7-107
R-674	2	A	7-107
R-675	2	B	7-107
R-676	2	B	7-107
R-678	2	B	7-107
R-679	2	A	7-107
R-680	15	B	7-106
R-681	15	B	7-106
R-682	4	H	7-106
R-683	16	H	7-106
R-684	9	H	7-107
R-685	6	H	7-106
R-686	9	H	7-107
R-687	9	H	7-107
R-688	9	H	7-107
R-689	14	B	7-106
R-690	14	B	7-106
R-691	10	G	7-106
R-692	11	B	7-106
R-693	12	B	7-106
R-694	13	B	7-106
R-695	12	B	7-106
R-696	13	B	7-106
R-697	13	B	7-106
R-698	14	B	7-106
R-699	14	B	7-106
R-1601	11	B	7-106
R-1602	11	B	7-106
R-1603	11	B	7-106
R-1604	11	B	7-106
R-1605	11	B	7-106
R-1606	10	B	7-106
R-1607	10	B	7-106
R-1608	10	B	7-106
R-1609	10	B	7-106
R-1610	9	F	7-106
R-1611	14	E	7-106
R-1612	13	E	7-106
R-1613	10	B	7-106
R-1614	9	B	7-106
R-1615	9	B	7-106
R-1616	8	B	7-106
R-1617	8	G	7-106
R-1618	5	F	7-106
R-1619	5	B	7-106
R-1620	7	B	7-106
R-1621	7	B	7-106
R-1622	5	B	7-106
R-1623	5	B	7-106
R-1624	5	B	7-106
R-1625	5	B	7-106
R-1626	7	B	7-106
R-1627	4	B	7-106
R-1628	4	B	7-106
R-1629	7	G	7-106
R-1630	5	C	7-106
R-1632	7	B	7-106
R-1633	7	E	7-107
R-1634	13	E	7-107
R-1635	2	C	7-107
R-1636	2	C	7-107
R-1637	2	C	7-107
R-1638	2	C	7-107
R-1639	2	C	7-107
R-1640	2	C	7-107
R-1641	2	C	7-107
R-1642	2	B	7-107
R-1643	2	B	7-107
R-1644	2	B	7-107
R-1645	2	B	7-107
R-1646	2	B	7-107
R-1647	8	H	7-107
R-1648	10	H	7-107
R-1649	10	H	7-107
R-1650	10	H	7-107
R-1651	11	H	7-107
R-1652	11	H	7-107
R-1653	8	H	7-107
R-1654	8	H	7-107
R-1655	12	G	7-106
R-1656	10	H	7-107
R-1657	10	F	7-107
R-1658	9	H	7-107
R-1659	9	H	7-107
R-1660	13	D	7-107
R-1661	13	D	7-107
R-1662	13	D	7-107
R-1663	13	D	7-107
R-1664	17	E	7-107
R-1665	11	H	7-107
R-1666	11	H	7-107
R-1667	17	E	7-107
R-1668	17	E	7-107
R-1669	11	F	7-107
R-1670	12	E	7-107
R-1671	11	H	7-107
R-1672	11	H	7-107
R-1673	11	H	7-107
R-1674	11	H	7-107
R-1675	11	H	7-107
R-1676	11	H	7-106
R-1677	12	D	7-107
R-1678	17	E	7-107
R-1679	17	D	7-107
R-1680	17	E	7-107
R-1681	17	E	7-107
R-1682	11	B	7-107
R-1683	11	B	7-107
R-1684	17	D	7-107
R-1685	17	D	7-107
R-1686	17	D	7-107
R-1687	14	H	7-106
R-1688	17	E	7-107
R-1689	13	G	7-106
R-1690	17	D	7-107
R-1691	11	B	7-107
R-1692	11	B	7-107
R-1693	14	G	7-106
R-1694	15	G	7-106
R-1695	15	G	7-106
R-1696	16	G	7-106
R-1697	17	D	7-107
R-1698	17	D	7-107
R-2601	13	H	7-106
R-2602	17	D	7-107
R-2603	12	F	7-108
R-2604	12	F	7-108
R-2605	12	F	7-108
R-2606	12	F	7-108
R-2607	11	F	7-108
R-2608	11	F	7-108
R-2609	11	F	7-108
R-2611	11	E	7-108
R-2612	11	E	7-108
R-2613	11	E	7-108
R-2614	11	E	7-108
R-2615	11	D	7-108
R-2616	11	D	7-108
R-2617	4	C	7-108
R-2619	14	B	7-108
R-2620	4	B	7-106
R-2621	3	D	7-107
R-2622	8	B	7-107
R-2623	15	D	7-107
R-2624	12	G	7-108
R-2625	4	C	7-107
R-2626	8	B	7-106
R2627	7	G	7-108
S-601	3	G	7-108
S-602	6	C	7-108
S-603	18	B	7-106
S-606	8	D	7-107
S-607	9	B	7-107
S-608A	3	C	7-108
S-608B	4	C	7-108
S-609	12	D	7-107
S-610	10	C	7-108
S-611	14	C	7-108
S-612	15	E	7-108
S-613A-B	5	E	7-108
S-615	1	B	7-108
S-616	2	B	7-108
S-617	13	A	7-108
S-618	14	A	7-108
T-601	9	D	7-107
T-602	10	E	7-106
T-603	5	E	7-106
T-604	12	C	7-108
T-605	2	E	7-106
TP-7	10	C	7-107
TP-6	11	A	7-107
TP-8	11	B	7-107
TP-601	9	F	7-107
TP-602	6	F	7-107
TP-603	5	E	7-107
TP-604	13	F	7-107
TP-606	13	E	7-106
TP-607	9	E	7-106
TP-608	5	E	7-106
TP-609	14	F	7-107
TP-610	15	D	7-107
V-609	16	F	7-108
X1-601	4	E	7-108
X1-602	4	F	7-108
X1-603	4	F	7-108
X1-604	3	F	7-108
X1-605	3	F	7-108
X1-606	3	F	7-108
X1-607	3	E	7-108
X1-608	3	E	7-108
X1-609	6	B	7-108
X1-610	13	B	7-108
XV-601	5	C	7-107
XV-602	5	B	7-107
XV-603	8	F	7-107
XV-604	9	F	7-107
XV-605	7	F	7-107
XV-606	5	F	7-107
XV-607	5	E	7-107
XV-608	5	E	7-107
XV-609	6	B	7-107
XV-610	5	D	7-107
XV-613	12	F	7-107
XV-620	5	A	7-107
XV-621	13	F	7-107
XV-622	15	E	7-107
XV-623	15	E	7-107
XV-624	15	D	7-107
XV-625	14	B	7-107
XV-611	3	F	7-106
XV-612	3	G	7-106
XV-614	16	E	7-106
XV-615	14	E	7-106
XV-616	12	E	7-106
XV-617	8	E	7-106
XV-618	6	E	7-106
XV-619	3	I	7-106
XV-626	13	D	7-108
Z-601	1	F	7-106
Z-602	10	B	7-108
Z-603	11	B	7-108
Z-604	12	B	7-108
Z-605	11	B	7-108
Z-606	11	B	7-108
Z-607	9	E	7-107
Z-608	14	E	7-107



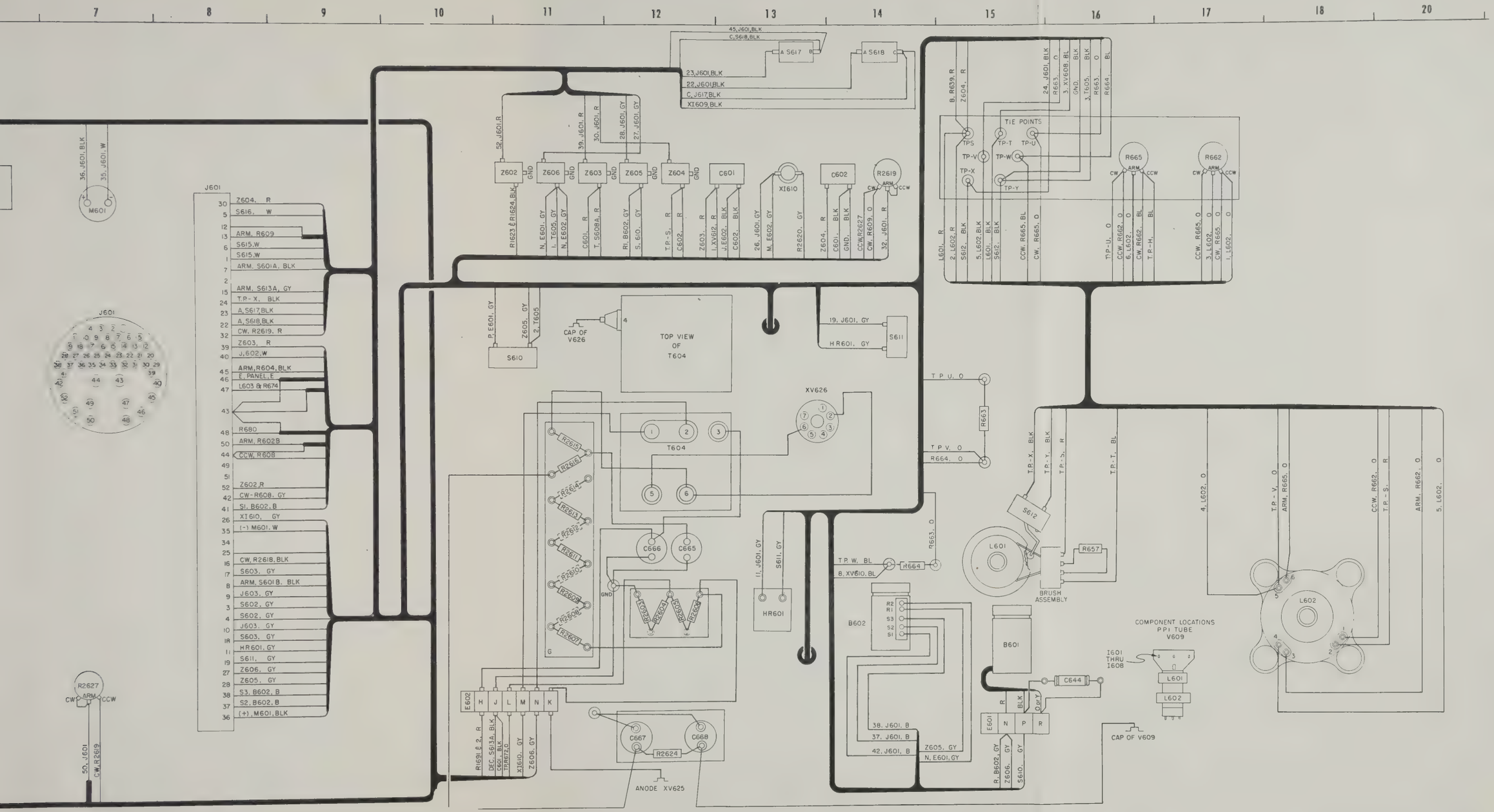
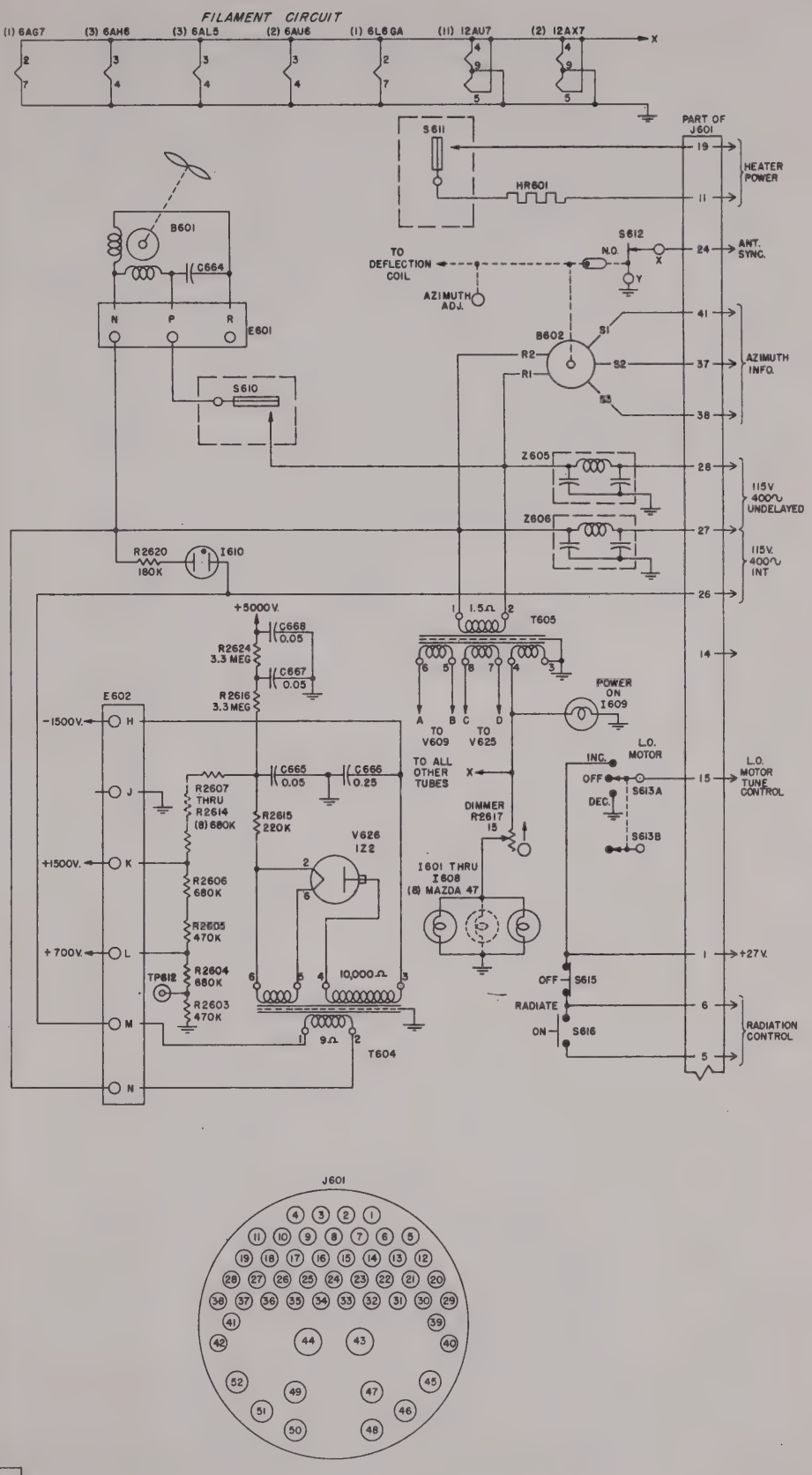


Figure 3. Azimuth-Range Indicator Practical Wiring Diagram (modified)



ge Indicator Schematic Diagram (modified)

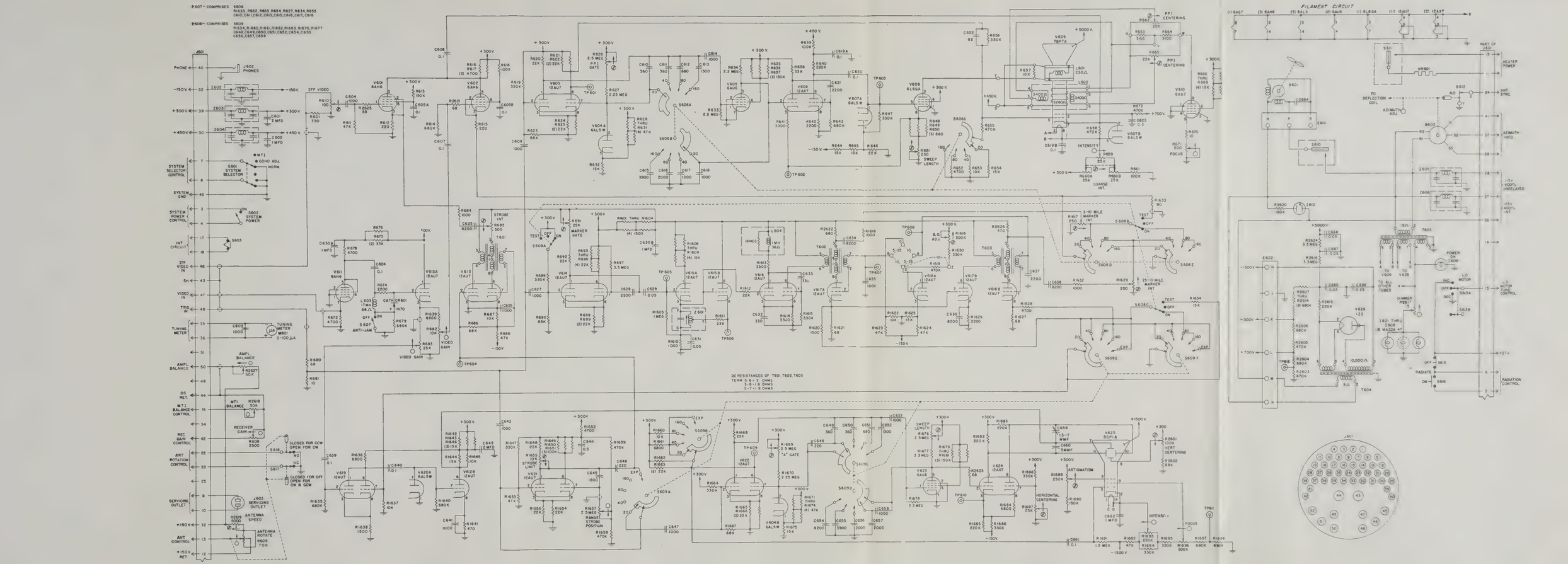


Figure 4. Azimuth-Range Indicator Schematic Diagram (modified)

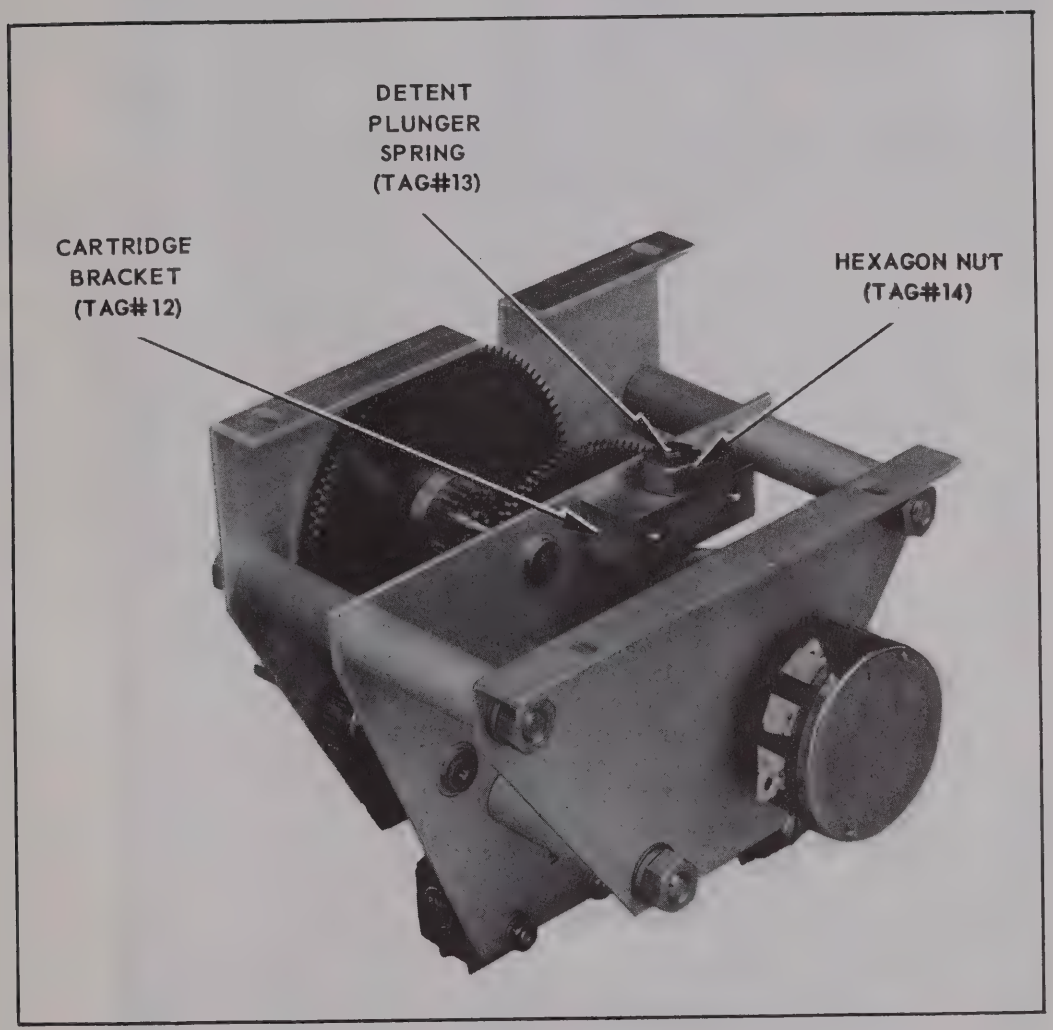


Figure 5. Azimuth-Range Indicator Antenna Speed Control Assembly

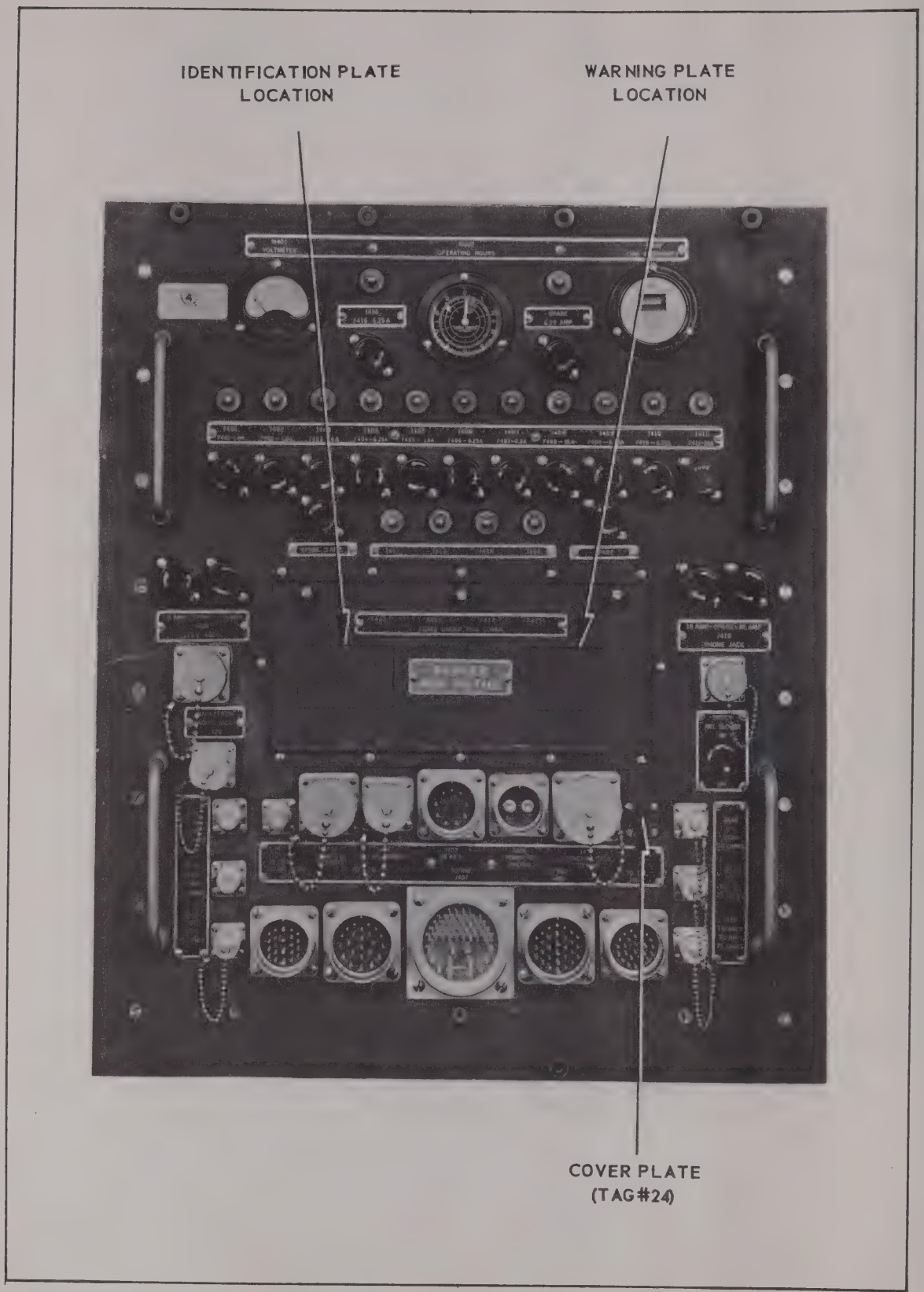


Figure 6. Power Supply Front Panel

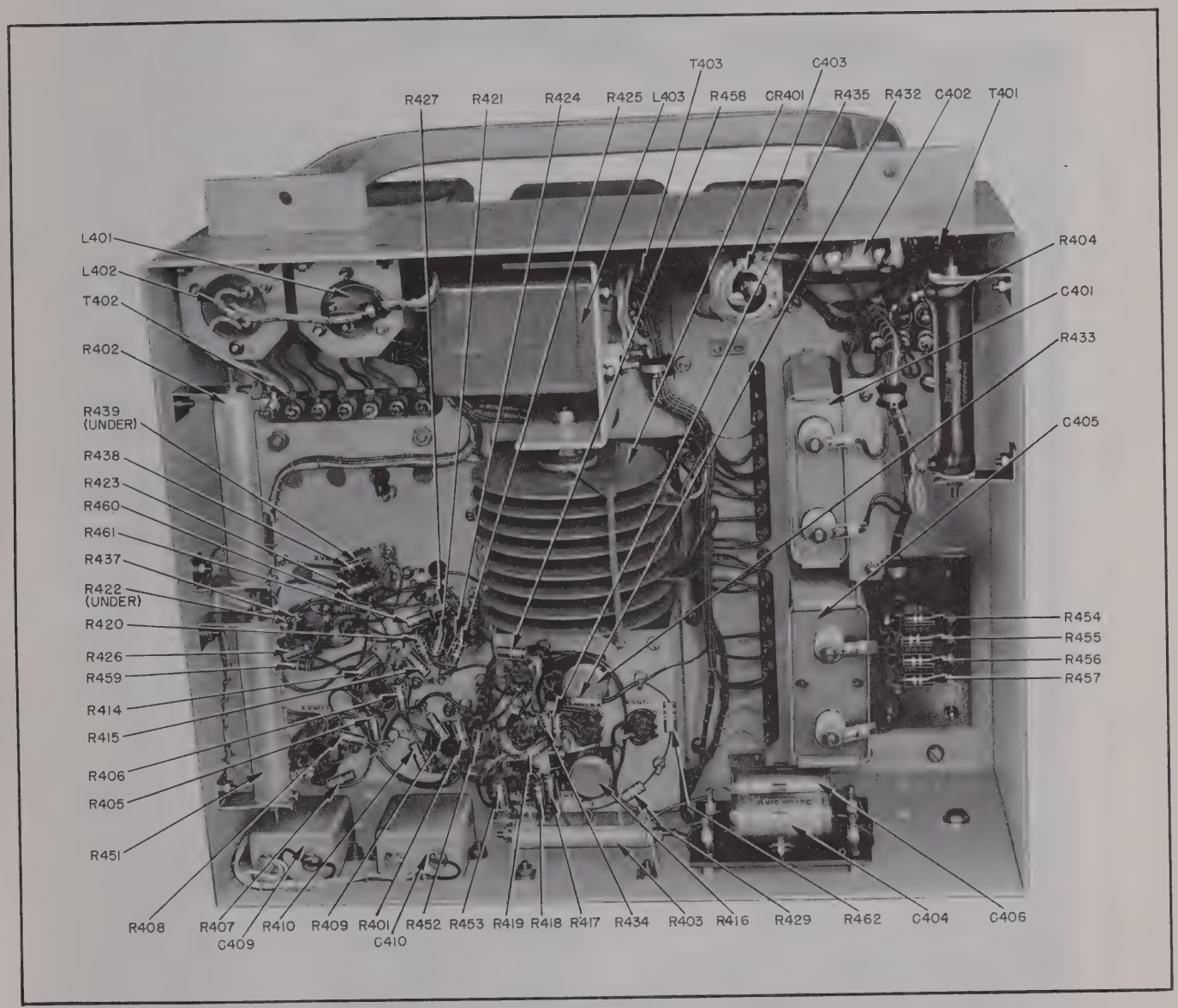


Figure 7. Power Supply Sub-chassis (modified)

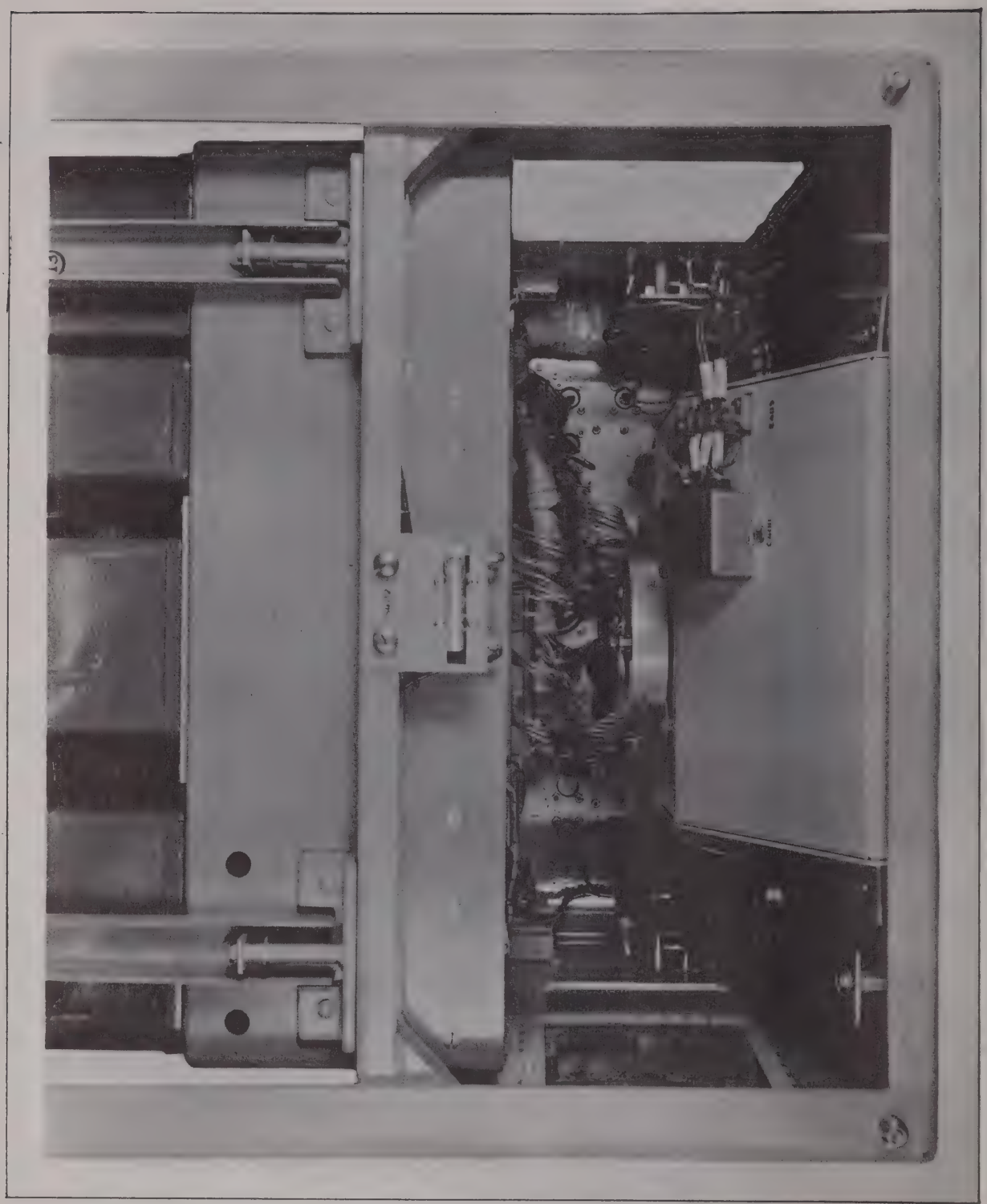
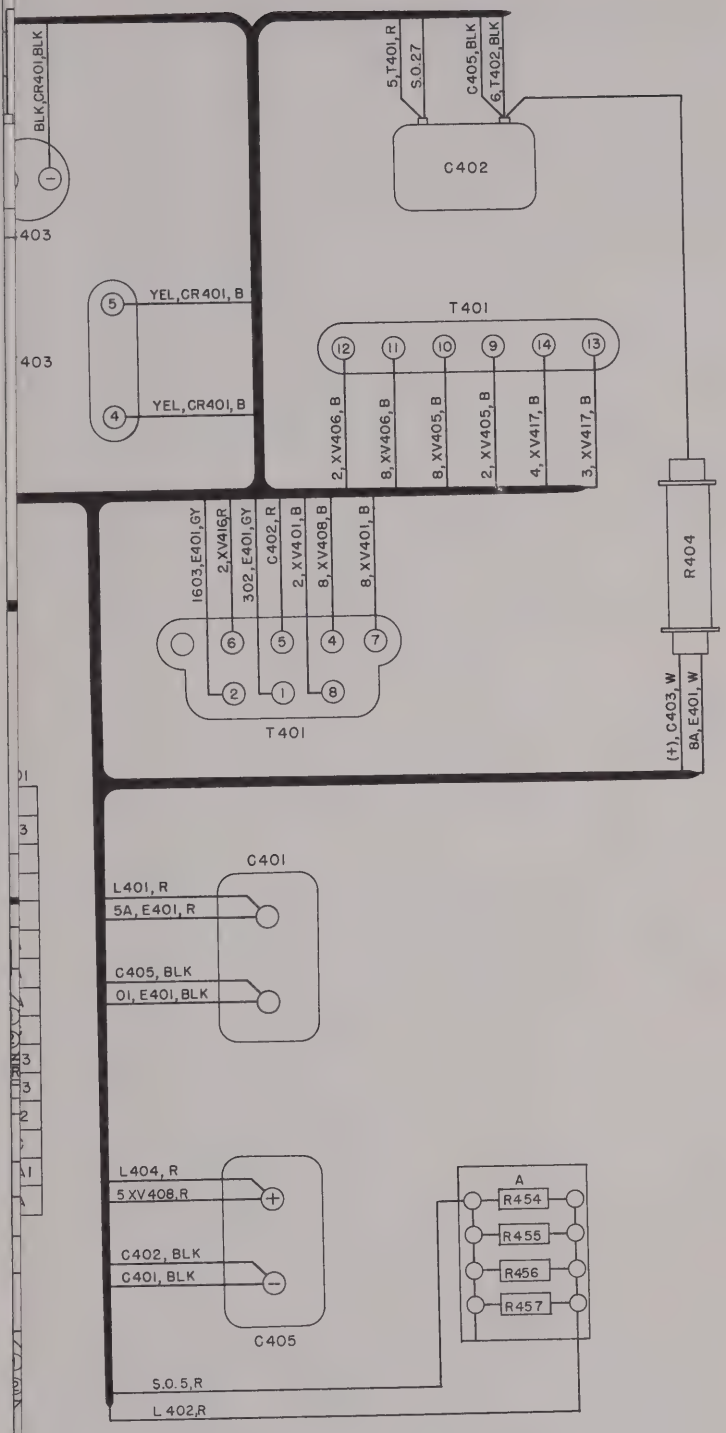


Figure 8. Power Supply, AFC Amplifier and T404 Removed



ctical Wiring Diagram (modified)

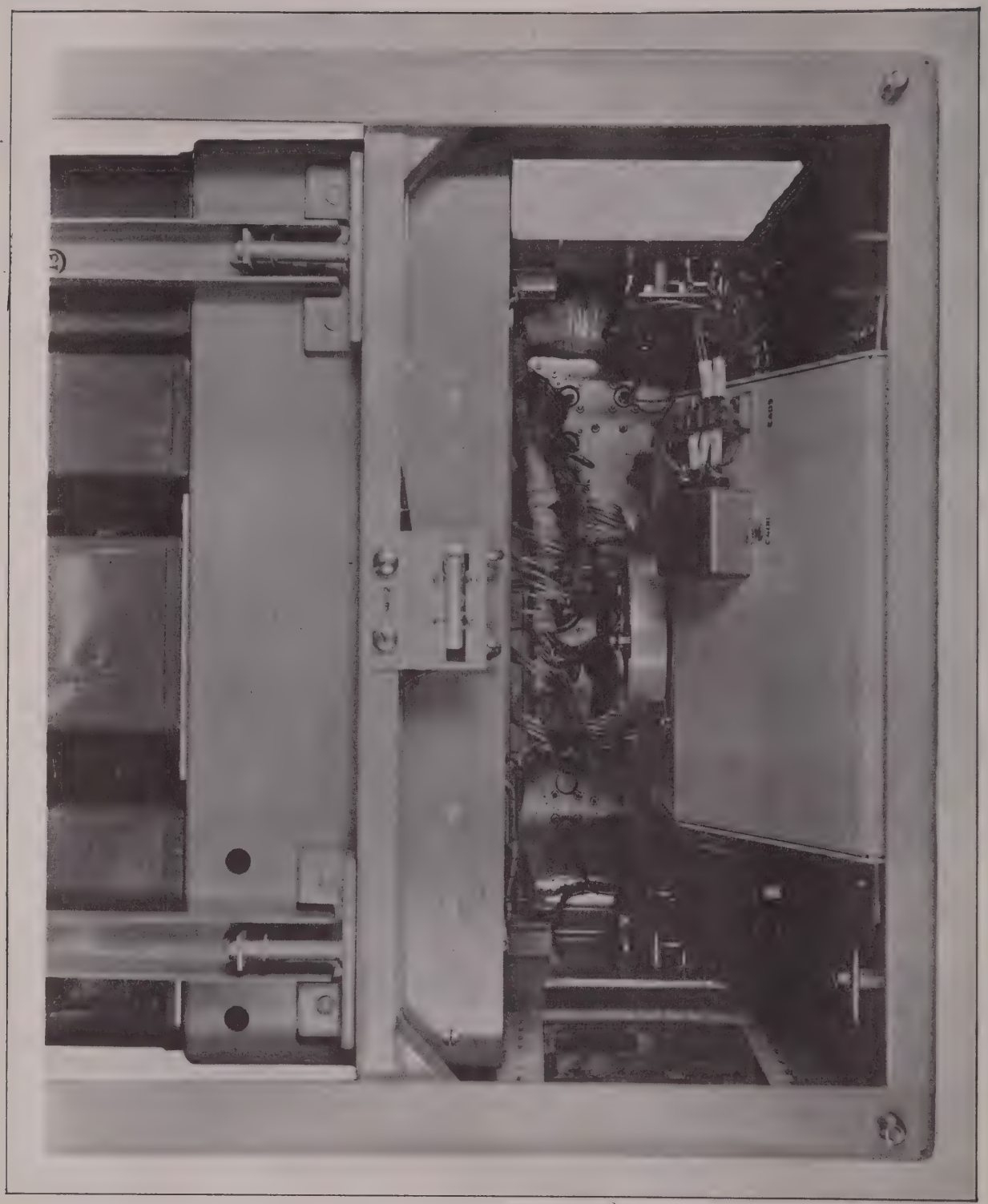


Figure 8. Power Supply, AFC Amplifier and T404 Removed

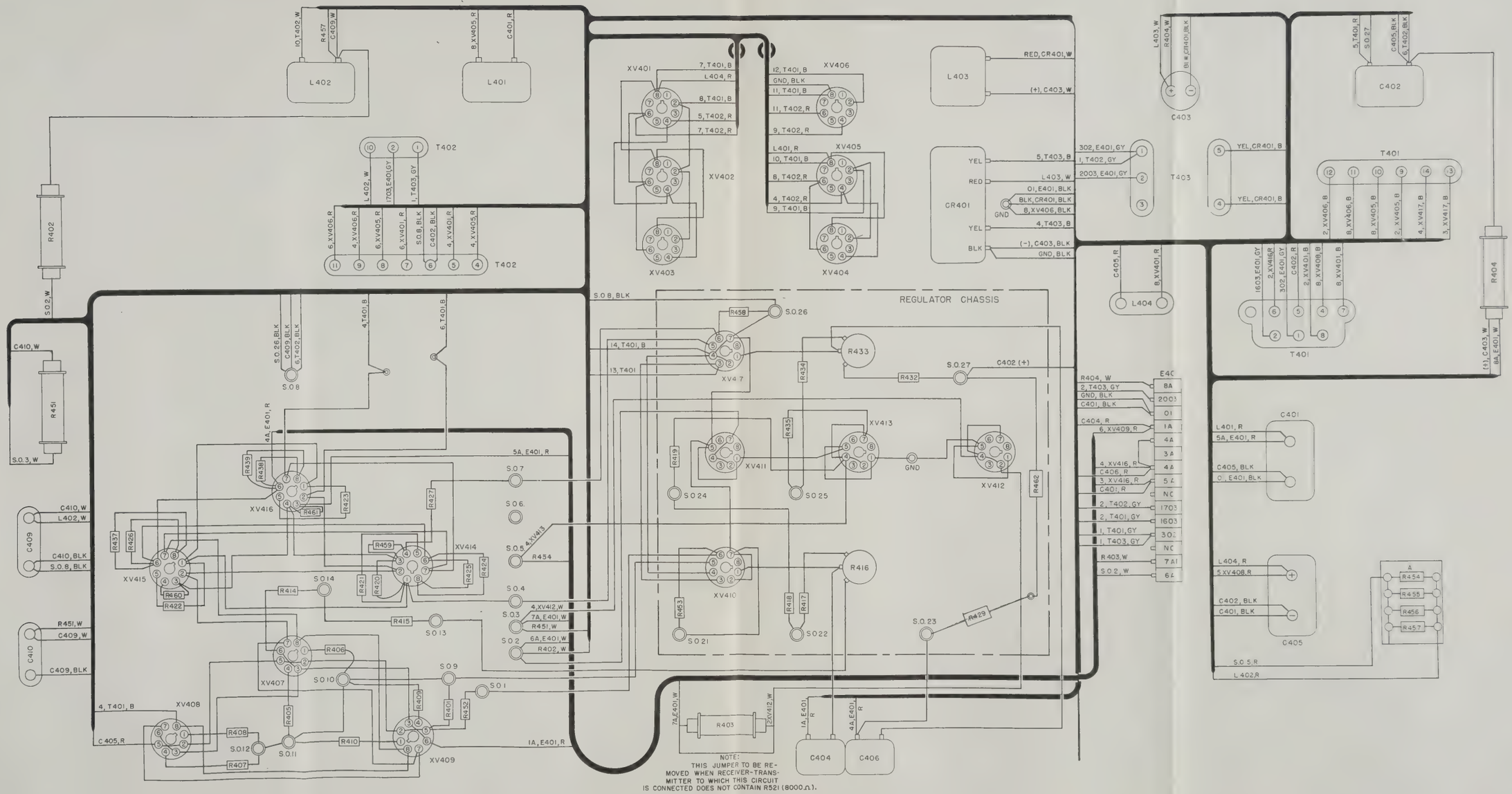
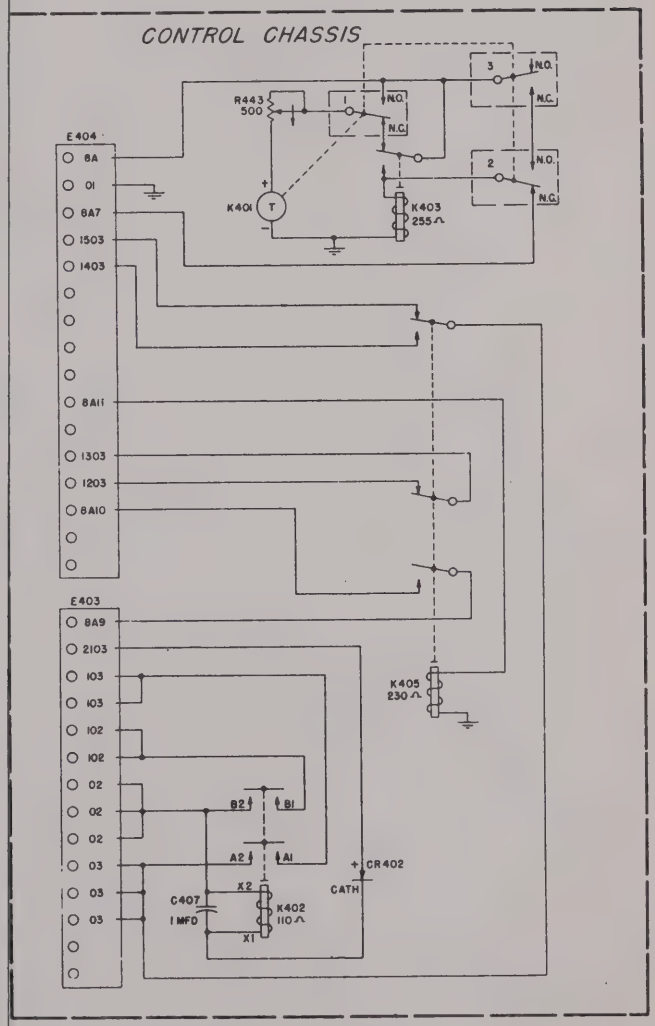


Figure 9. Power Supply Practical Wiring Diagram (modified)



matic Diagram (modified)

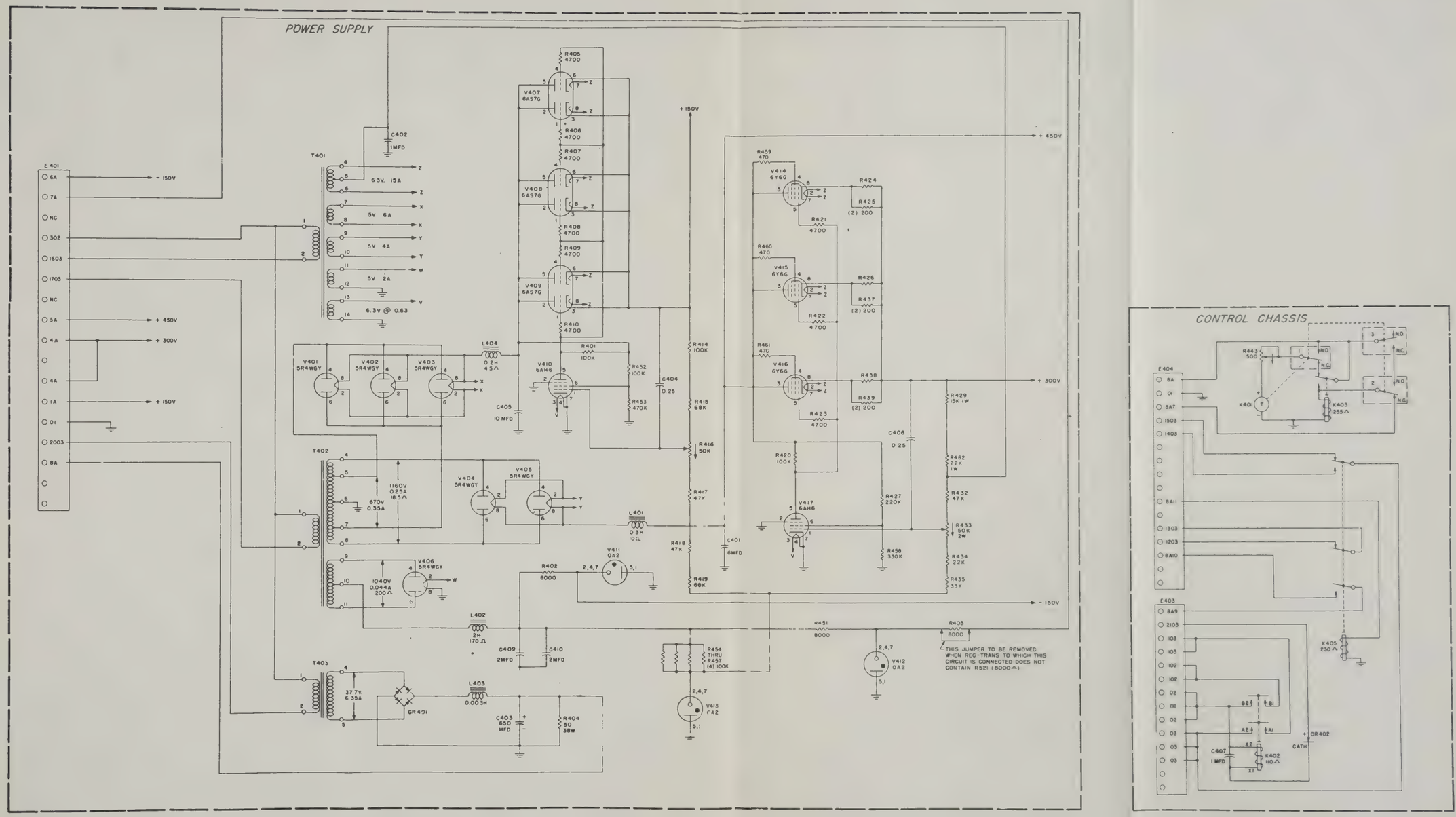


Figure 10. Power Supply Schematic Diagram (modified)

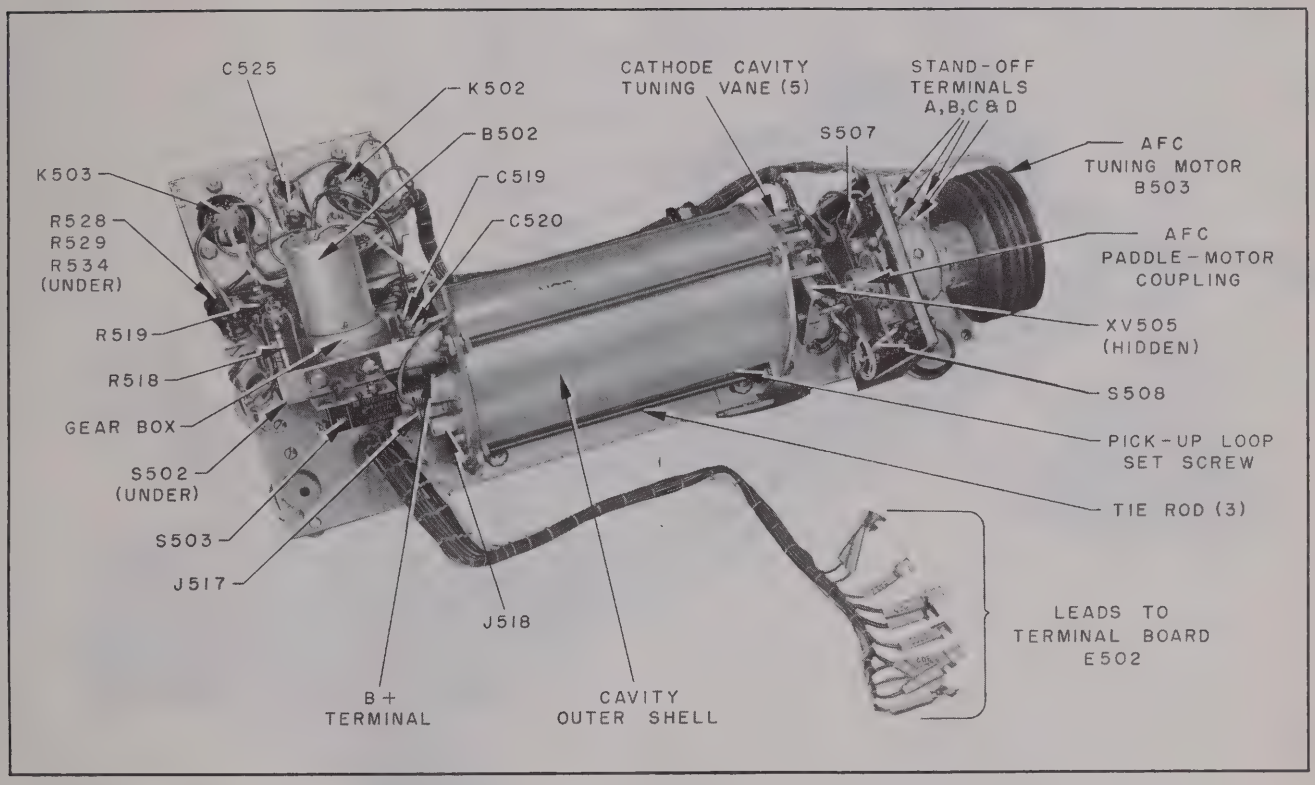


Figure 11. Local Oscillator and Control Circuit Assembly (unmodified)

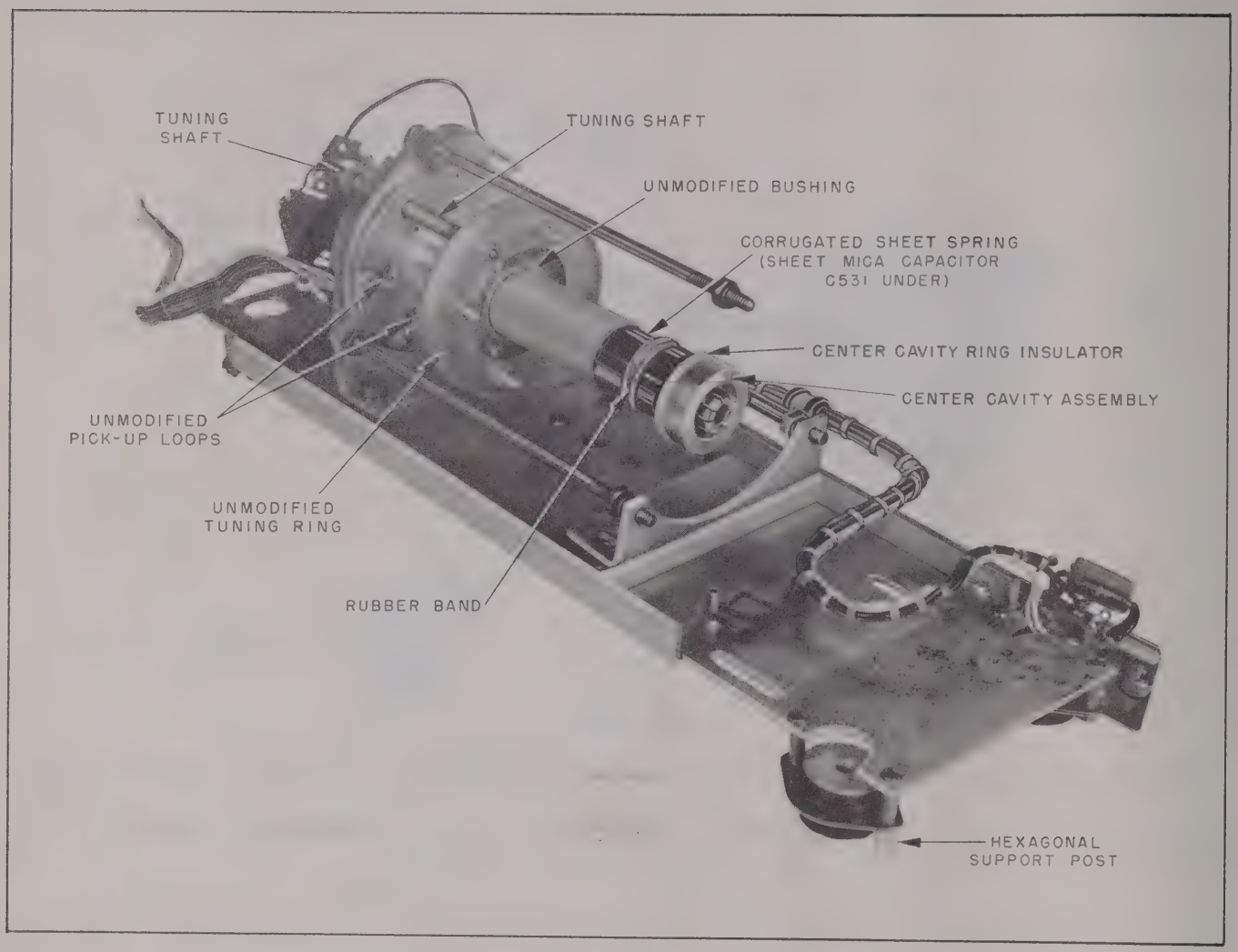


Figure 12. Local Oscillator Assembly
(showing inner cavity construction and sheet mica capacitor C531)

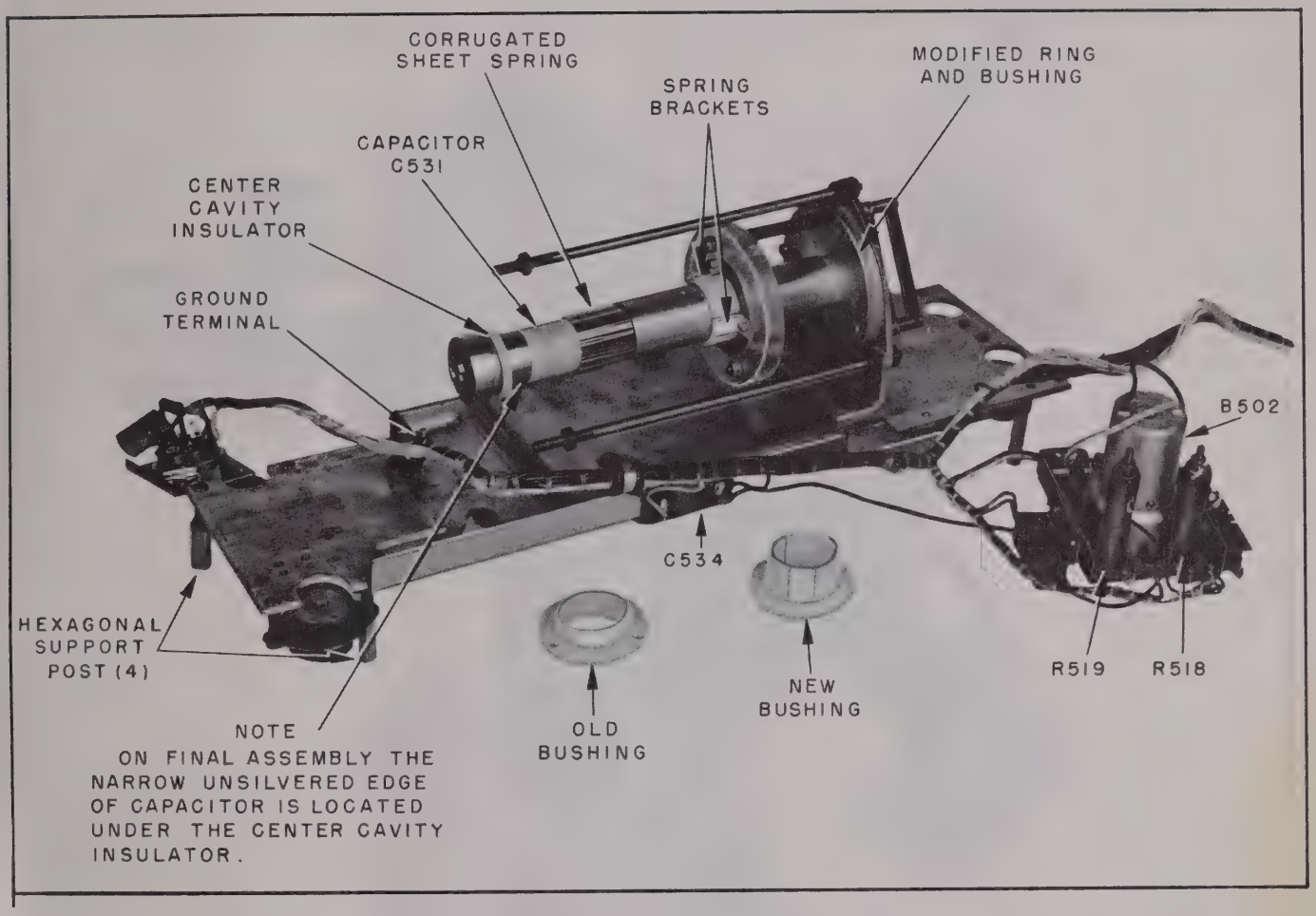


Figure 13. Local Oscillator Assembly (showing modified tuning ring)

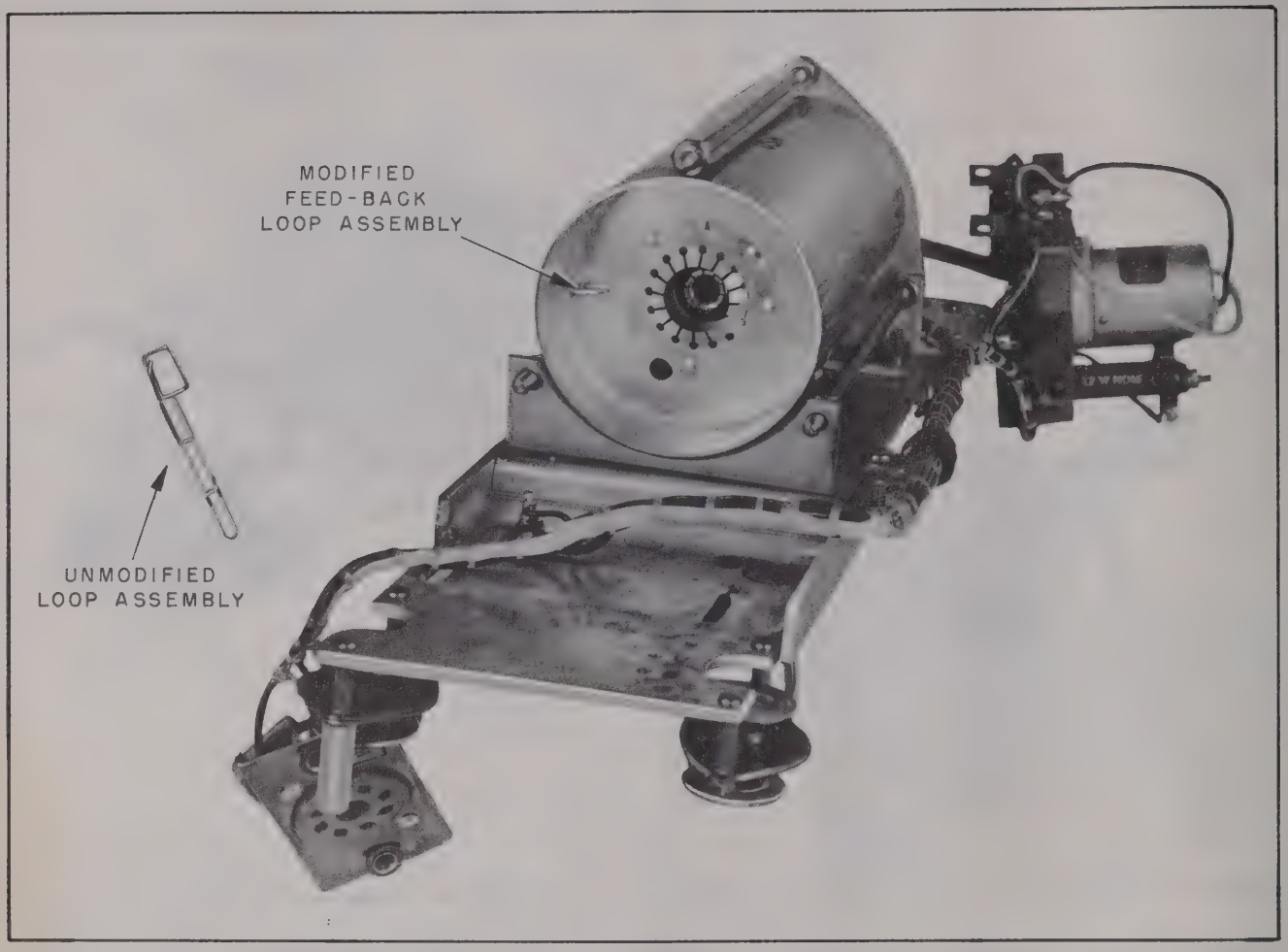


Figure 14. Local Oscillator Assembly (showing modified loop assembly)

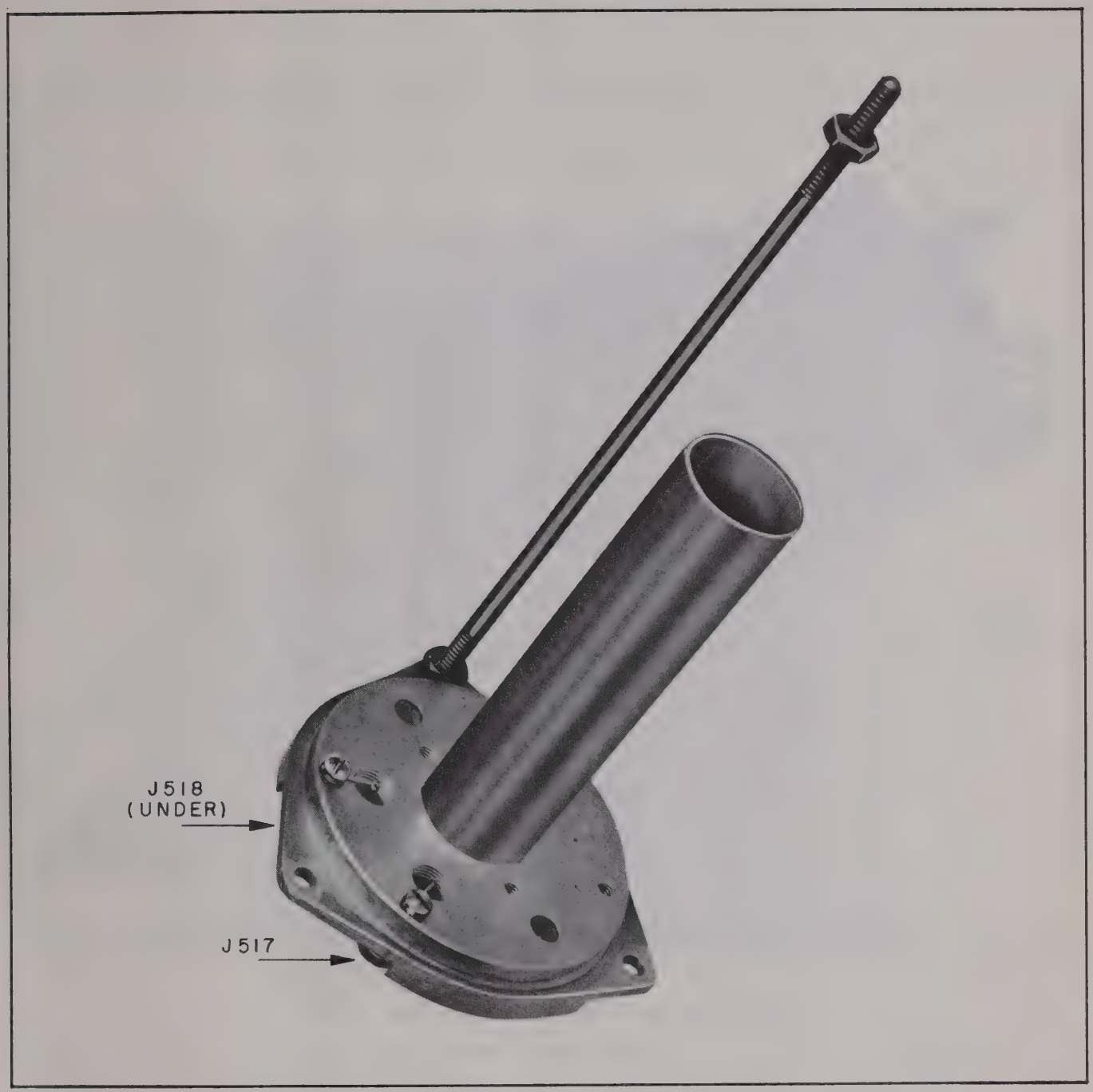


Figure 15. Local Oscillator Assembly
(showing modified pick-up loops at J517 and J518)

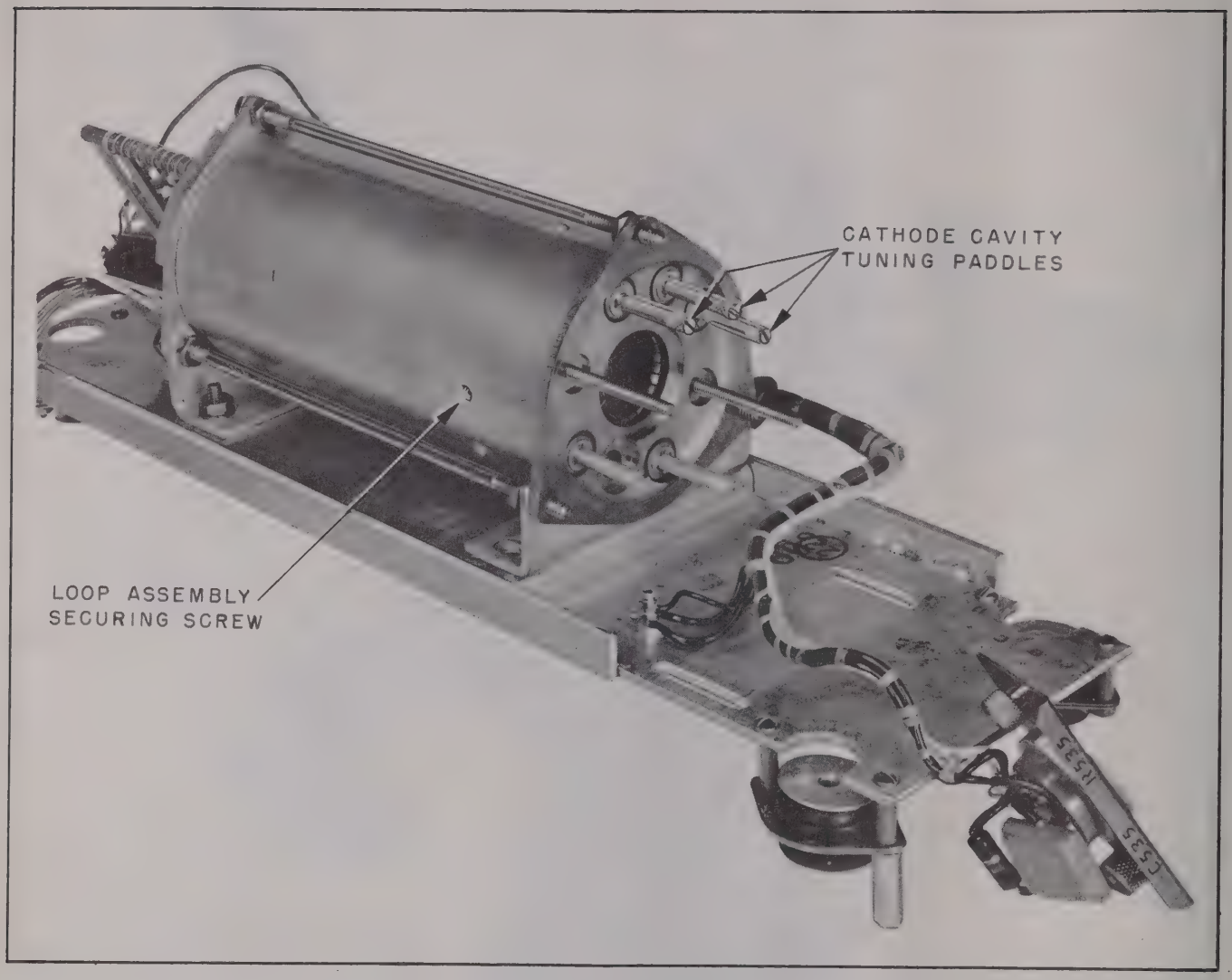


Figure 16. Local Oscillator Assembly
(showing modified socket end plate)

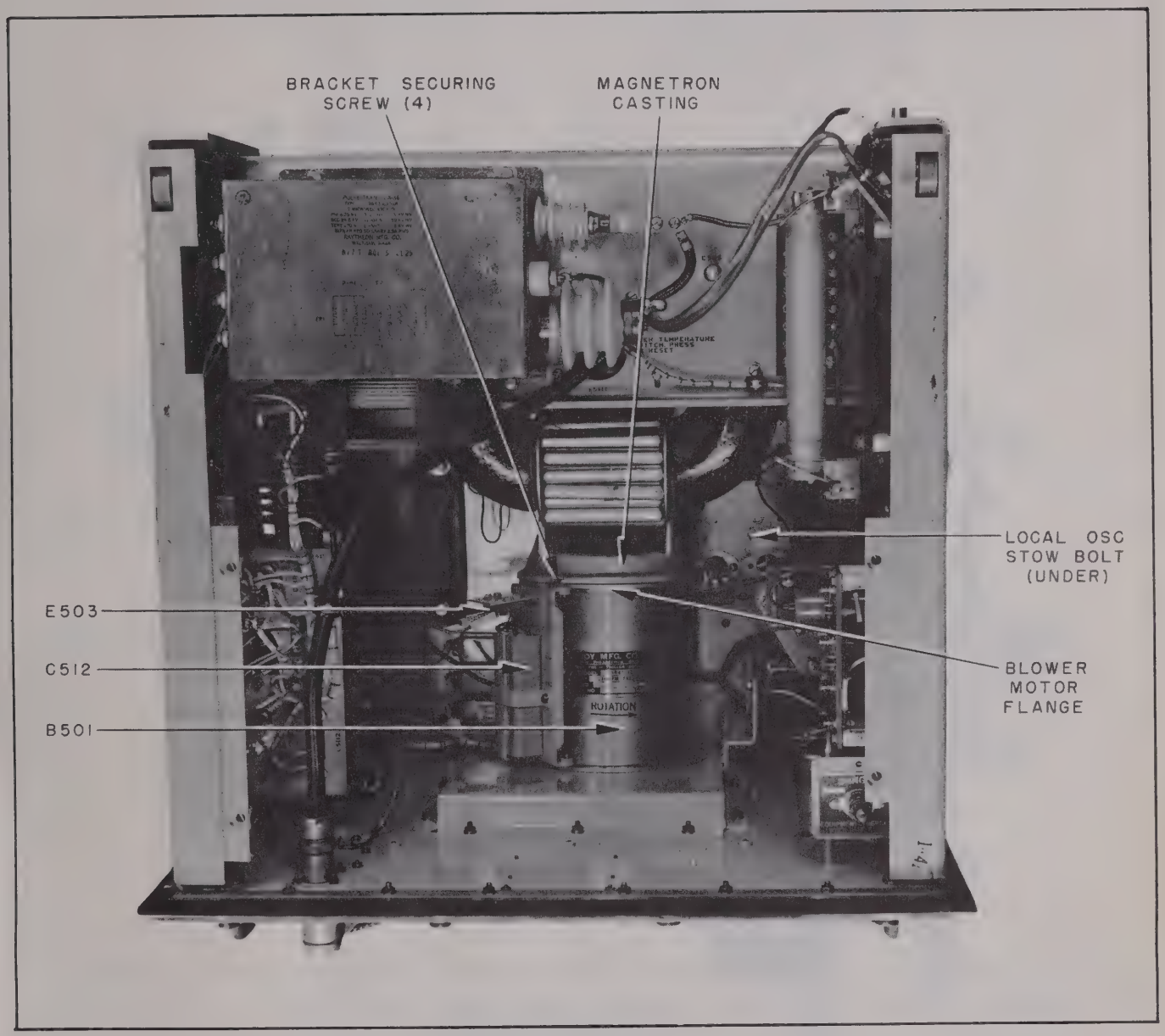


Figure 17. Receiver-Transmitter Blower Assembly

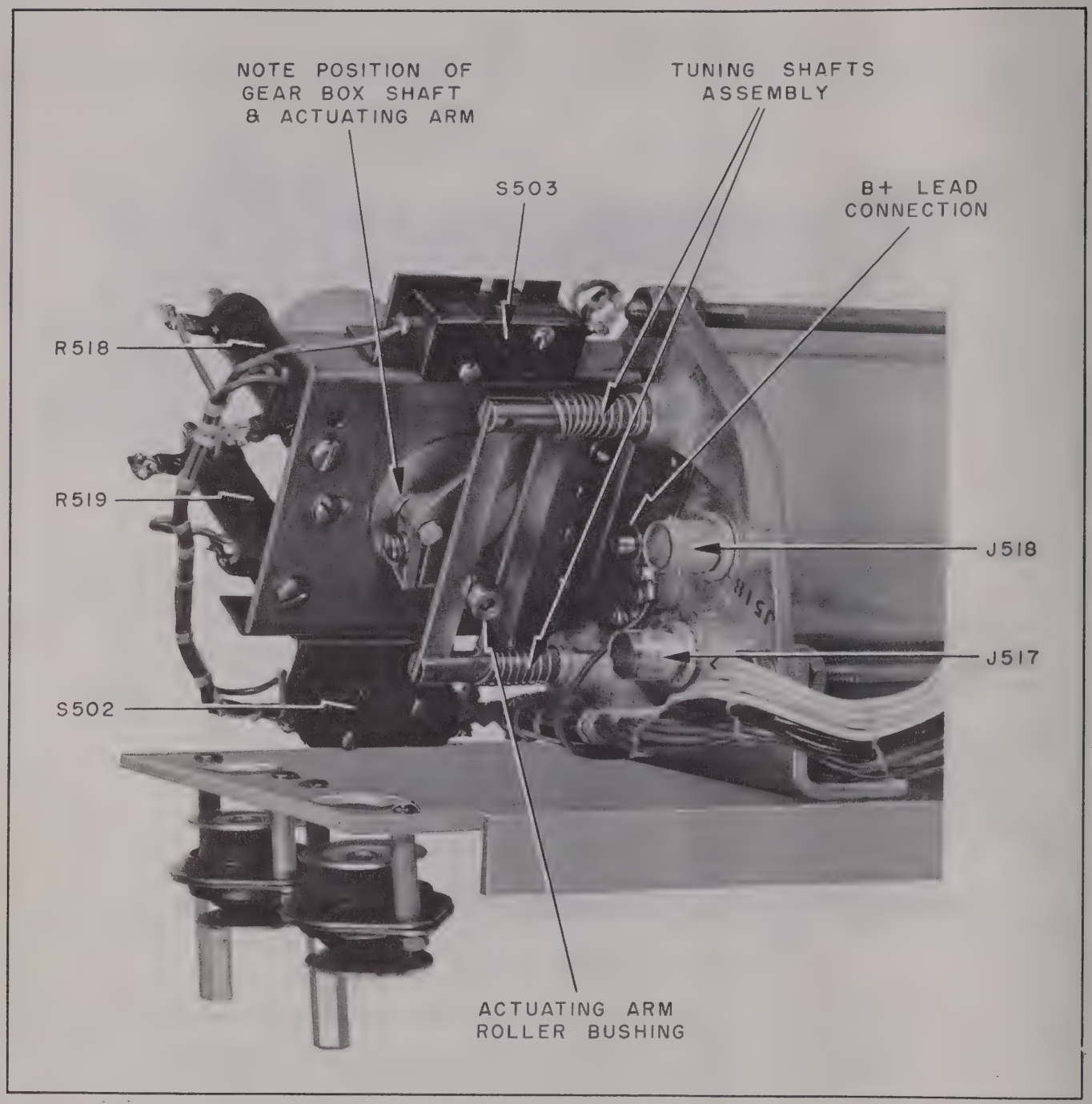


Figure 18. Local Oscillator Assembly (showing modified gear assembly)

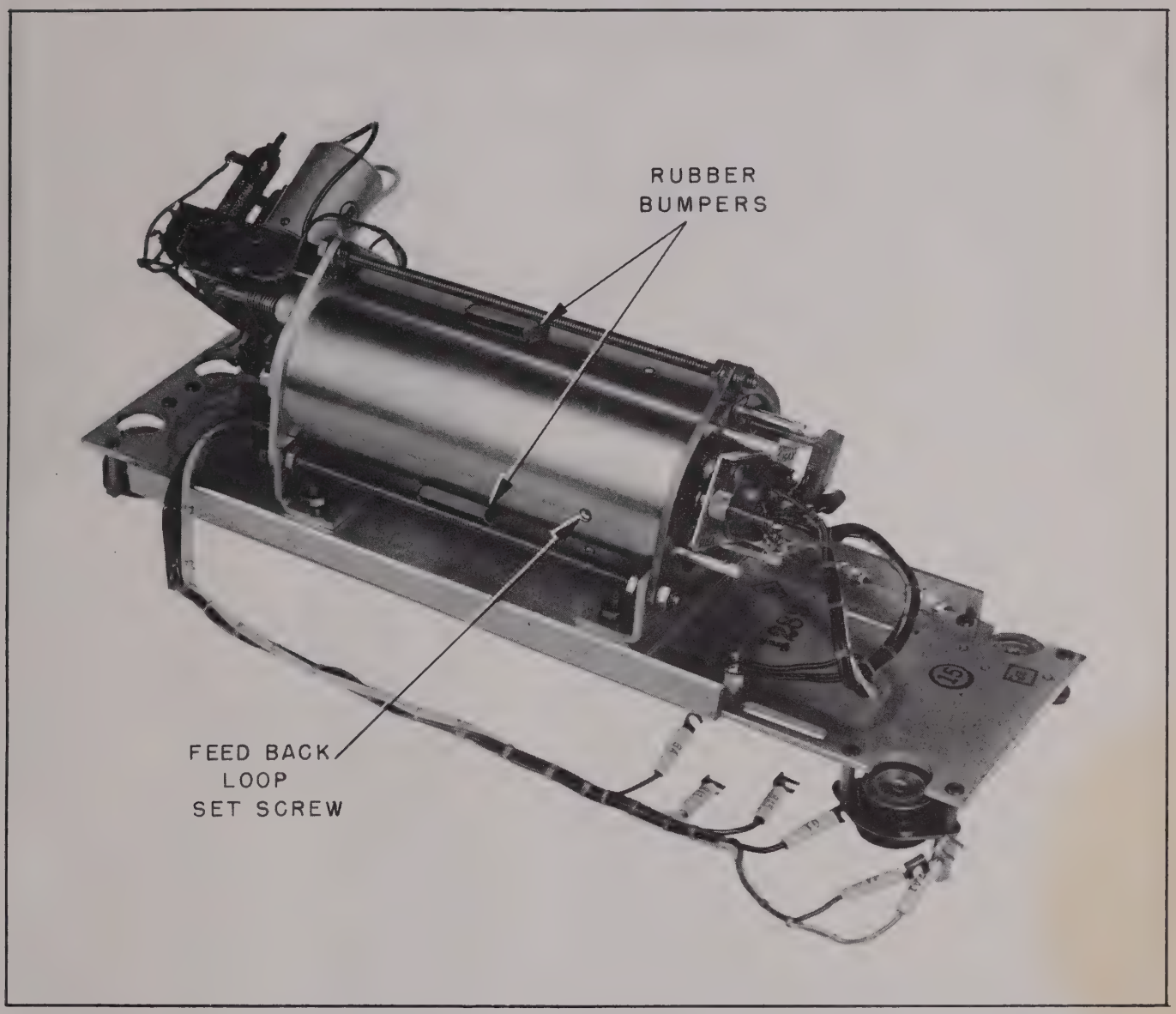


Figure 19. Local Oscillator and Control Circuit Assembly (modified)

7 8

llator and Control Circuit Assembly
ring Diagram (modified)

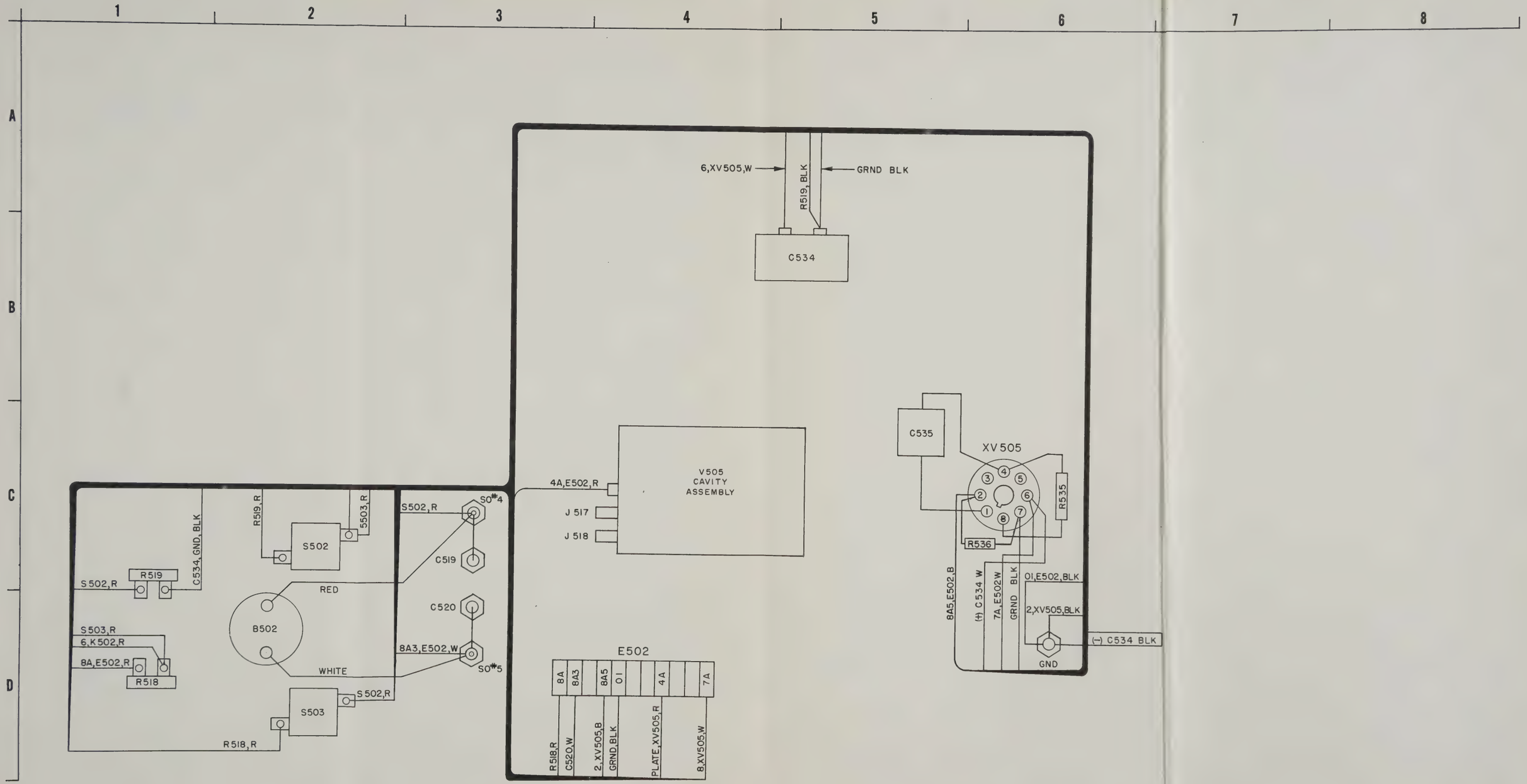


Figure 20. Local Oscillator and Control Circuit Assembly Practical Wiring Diagram (modified)

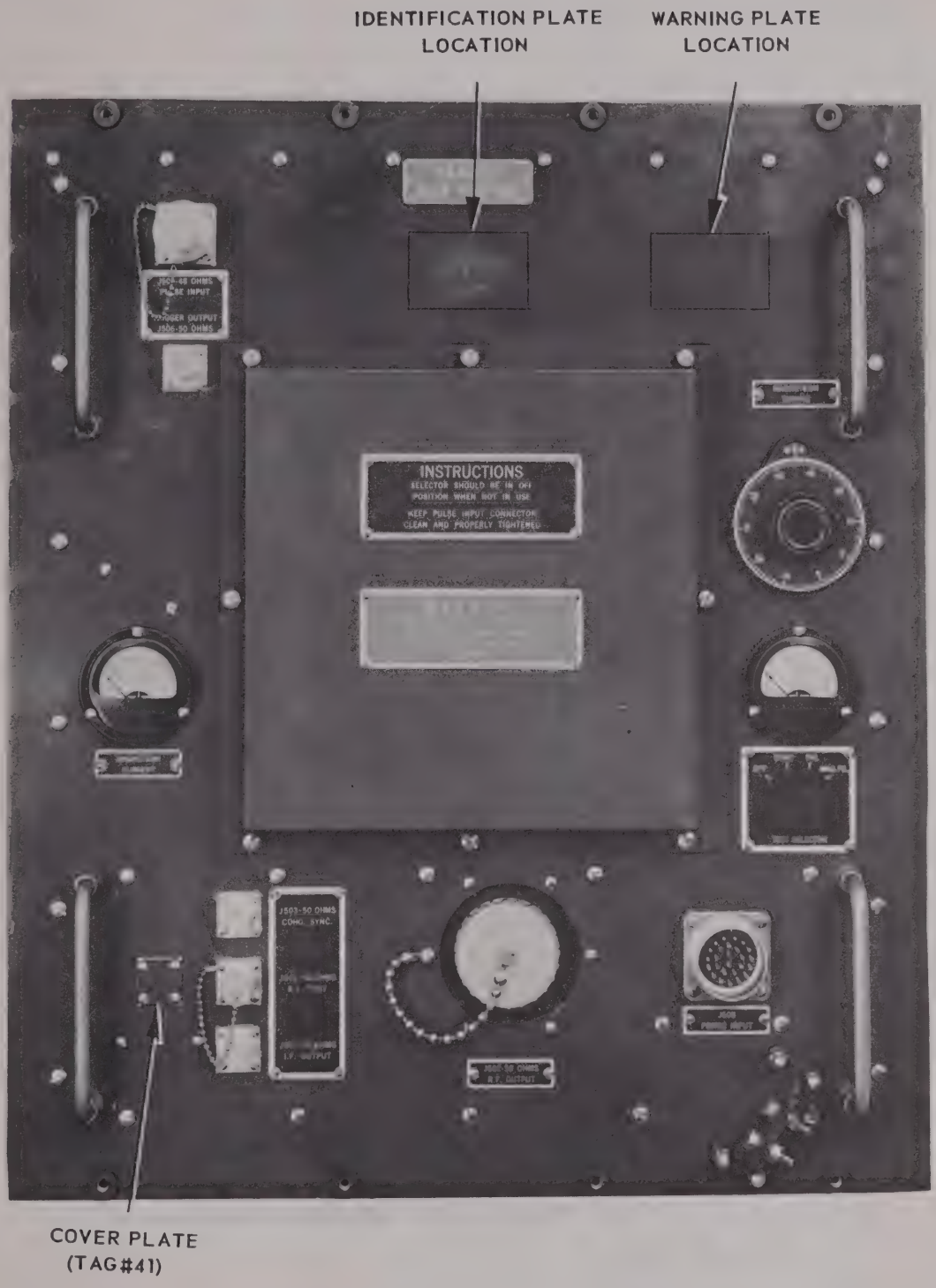
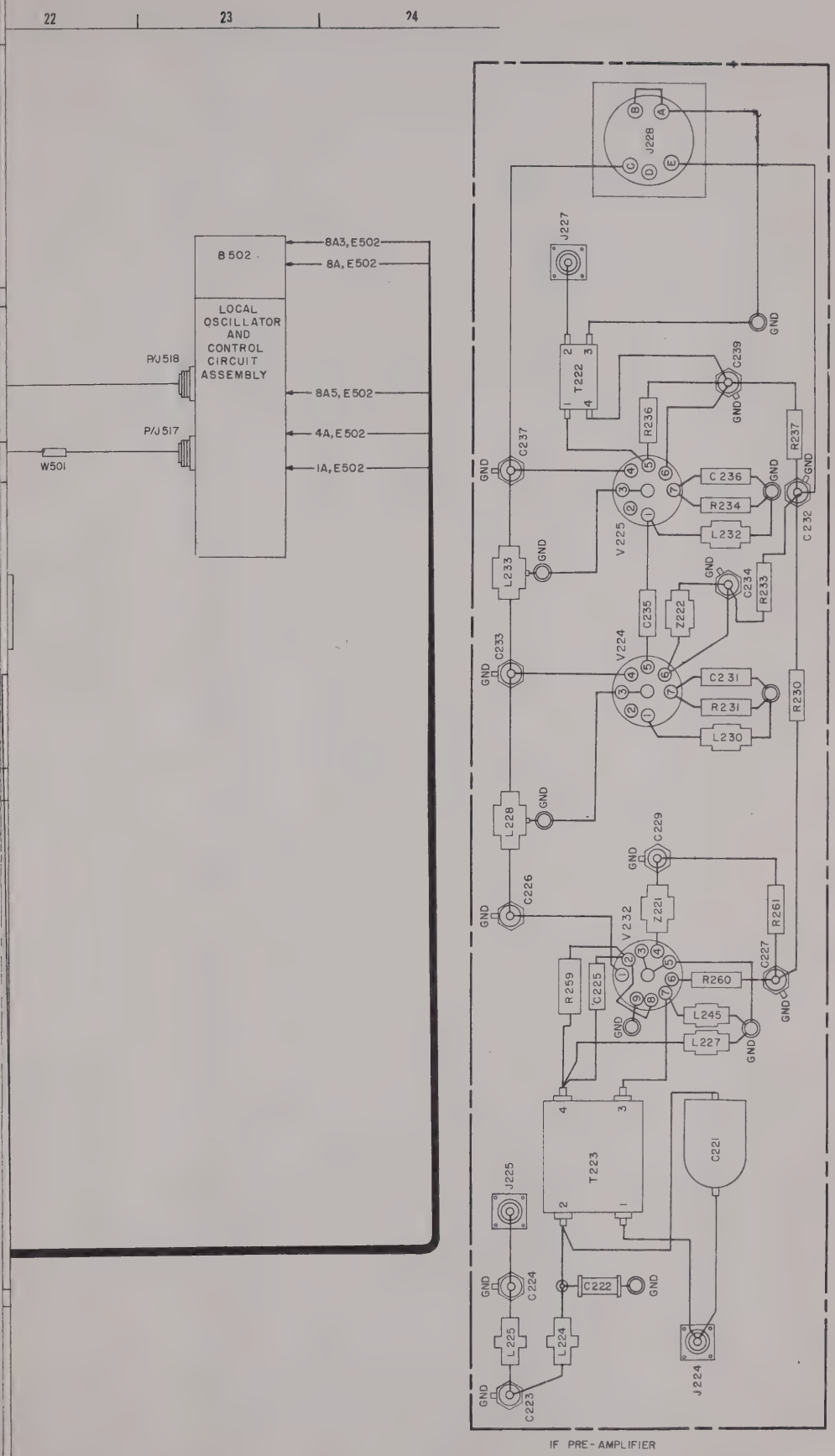

IDENTIFICATION PLATE LOCATION
WARNING PLATE LOCATION
INSTRUCTIONS
SELECTOR SHOULD BE IN OFF POSITION WHEN NOT IN USE
KEEP PULSE INPUT CONNECTOR CLEAN AND PROPERLY TIGHTENED
COVER PLATE (TAG#41)

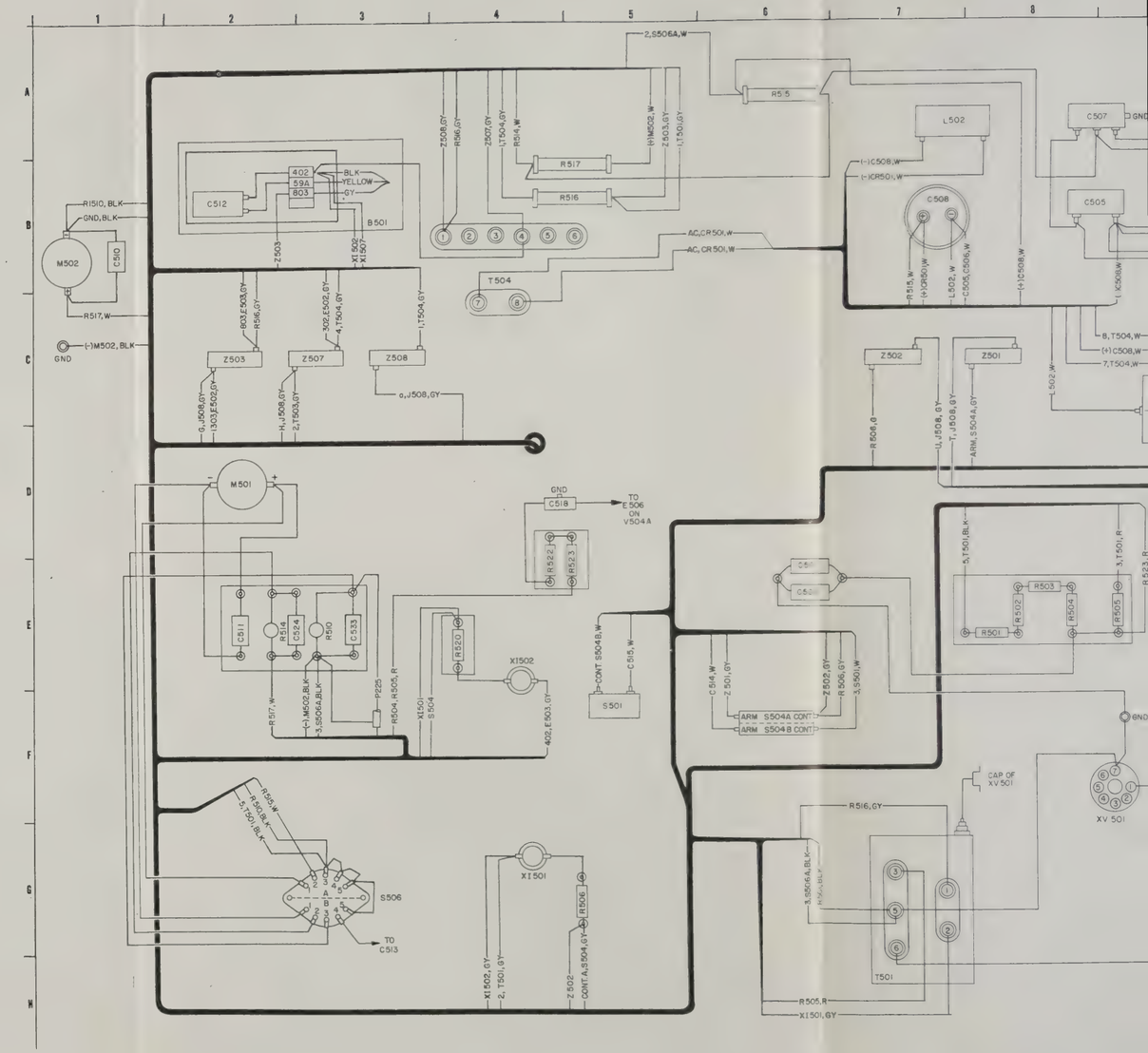
Figure 21. Receiver-Transmitter Front Panel



smitter Practical Wiring Diagram (modified)

COMPONENT LOCATIONS

SYMBOL	HORIZ	VERT
B501	B	3
B502	B	23
C221	G	26
C222	G	25
C223	H	25
C224	G	25
C225	F	25
C226	E	25
C227	F	26
C229	E	25
C231	D	26
C232	C	26
C233	D	25
C234	D	26
C235	D	25
C236	C	26
C237	C	25
C239	B	26
C501	E	6
C502	E	6
C503	E	15
C504	D	18
C505	B	9
C506	B	9
C507	A	9
C508	B	7
C509	B	11
C510	B	1
C511	E	2
C512	B	2
C513	A	13
C514	E	10
C515		
C516	F	11
C517		
C518	D	5
C522	G	15
C523	F	12
C524	E	2
C533	E	3
CR501	C	9
CR503	D	19
E501	G	19
E502	F	16
E505	E	18
E506	C	20
E553	G	12
E558	D	20
HR501	G	11
HR502	F	12
J501	A	19
J502	A	20
J503	A	21
J505	A	12
J506	G	11
J507	A	17
J508	A	15
J513	D	19
J224	H	26
J225	G	25
J227	B	25
J228	A	25
K501	F	12
L224	H	25
L227	F	26
L228	E	25
L230	D	26
L232	C	26
L233	C	25
L245	F	26
L501	D	13
L502	A	7
L504	G	12
M501	D	2
M502	B	1
P513	D	20
P516	D	18
P228	E	13
P/J504	B	20
P/J510	C	21
P/J511		
P/J512	D	19
P/J514	E	20
P/J515	C	20
P/J517	C	23
P/J518	B	23
P/J519	D	22
P/J521	D	21
P/J224	C	17
P/J225	F	13
P/J227	B	17
R231	D	26
R233	D	26
R234	C	26
R236	C	25
R237	C	26
R256	F	12
R259	F	25
R260	F	26
R261	E	26
R501	E	8
R502		
R503		
R504		
R505	E	9
R506	G	5
R507	D	16
R508	B	11
R509	A	11
R510	E	3
R514	E	2
R515	A	6
R516	B	5
R517	B	5
R520	E	4
R521	G	16
R522	E	4
R523	E	5
S501	F	5
S504	F	6
S505	H	13
S506	G	3
T222	B	25
T223	G	25
T501	G	7
T502	D	11
T503	G	13
T504	C	4
TP501	D	15
TP502		
TY501	C	16
U502	D	21
V224	D	25
V232	F	25
V502	E	19
V503A	D	20
V504A	C	20
W501	C	22
W502	D	19
W503	E	20
W504	C	20
X1501	G	4
X1502	E	4
XV501	F	9
Z221	E	25
Z222	D	25
Z501	C	8
Z502	C	7
Z503	C	2
Z505		
Z506	C	13
Z507	C	3
Z508	C	3
Z509	D	19



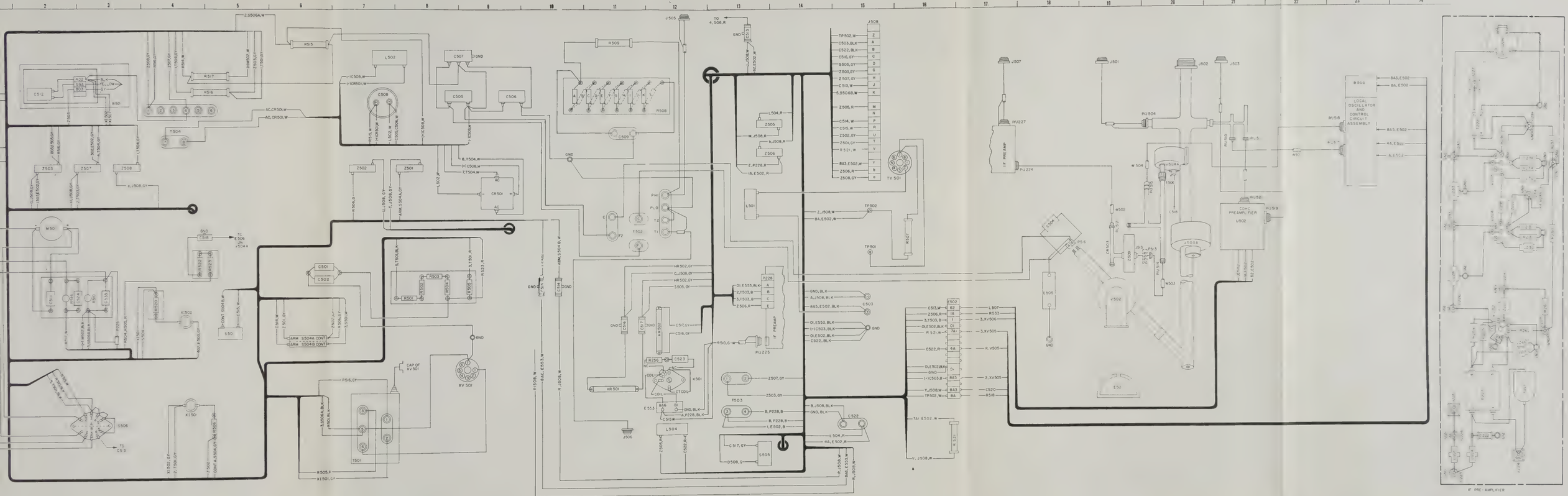
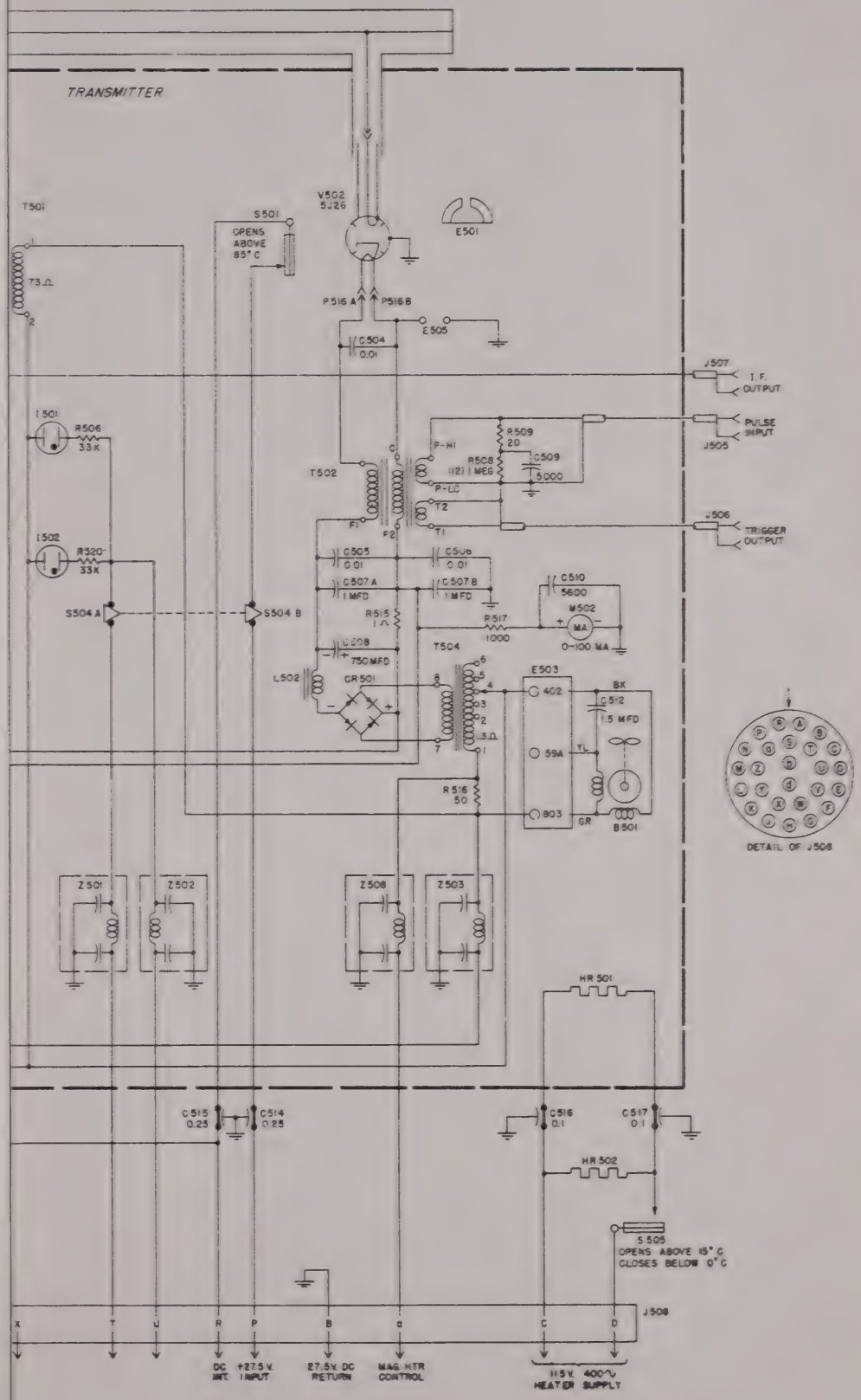


Figure 22. Receiver-Transmitter Practical Wiring Diagram (modified)



-Transmitter Schematic Diagram (modified)

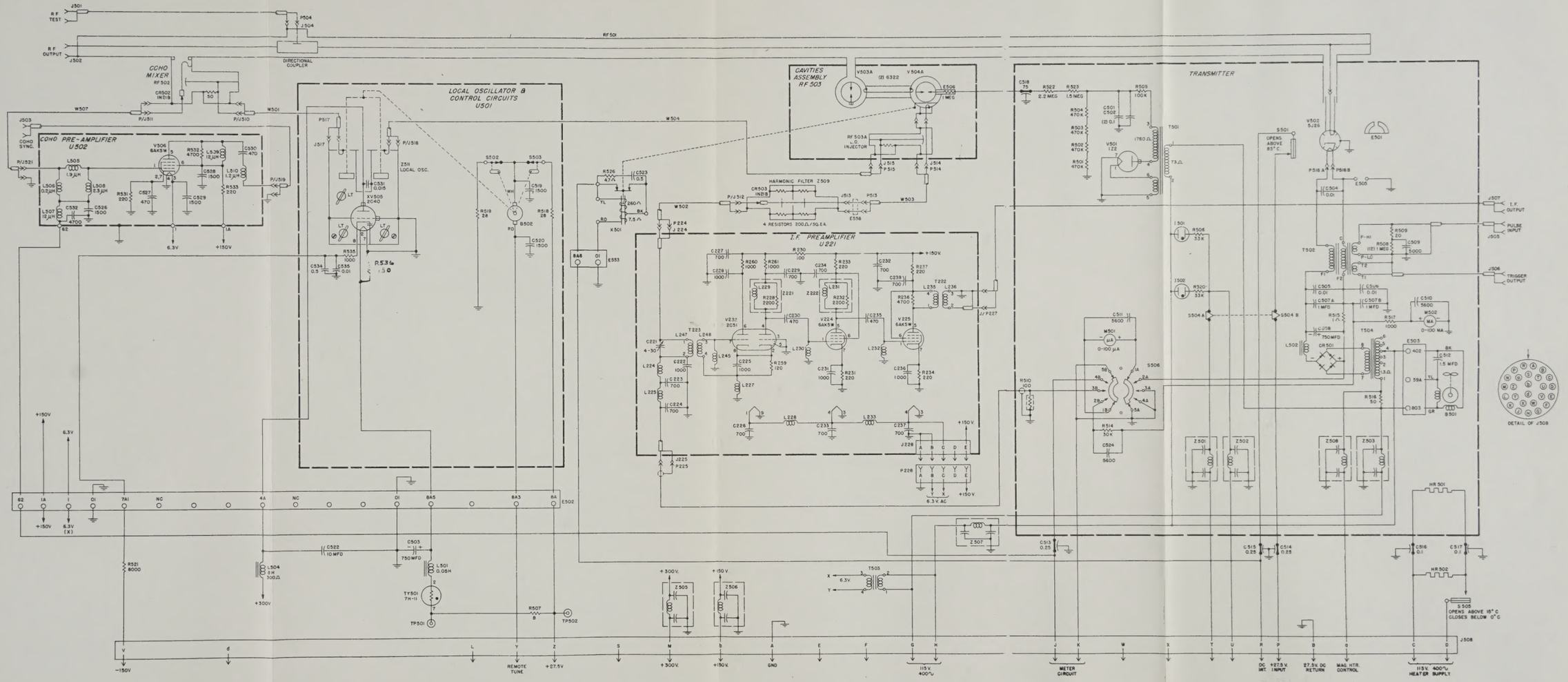


Figure 23. Receiver-Transmitter Schematic Diagram (modified)

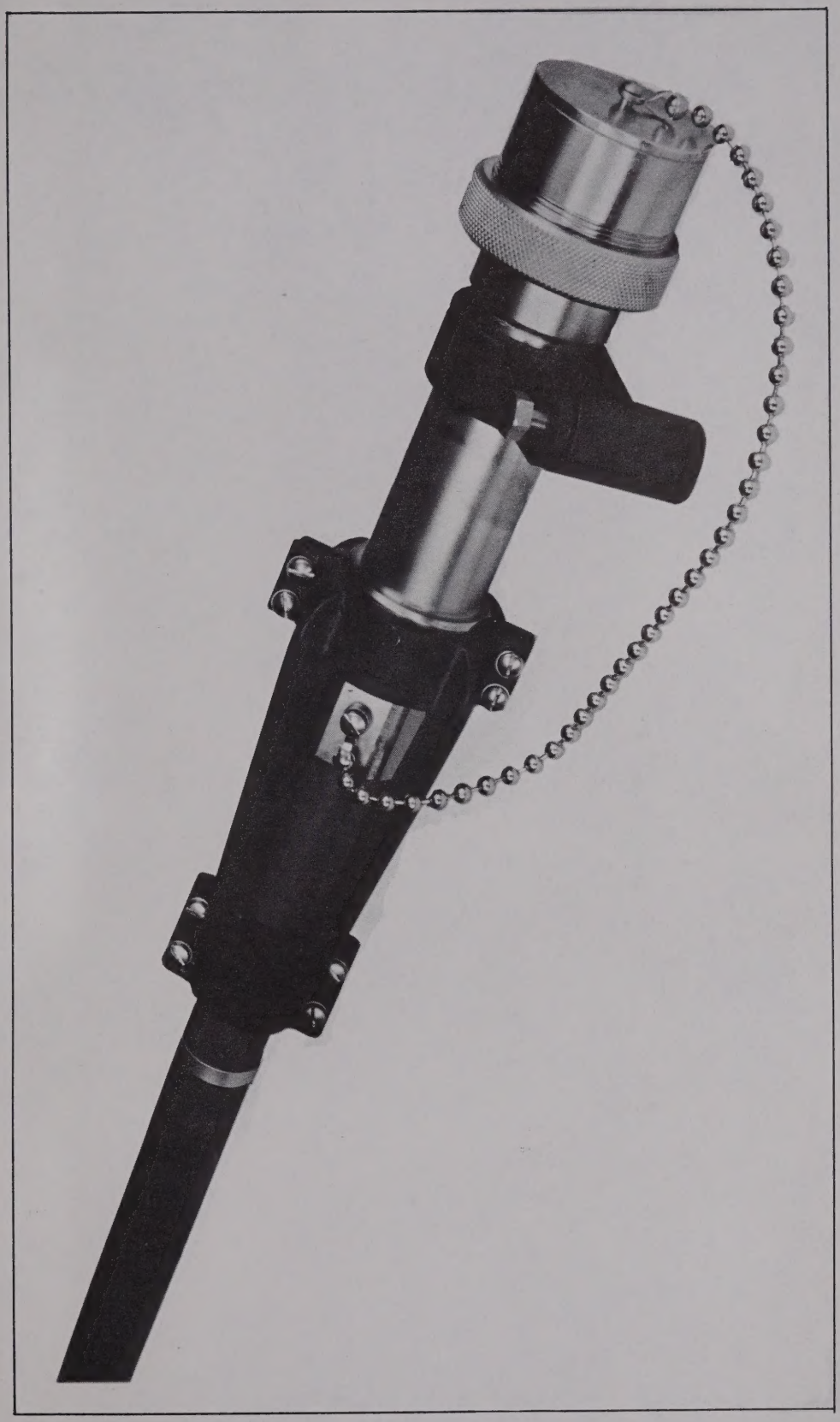


Figure 24. RF Cable (RF854) Clamps (installed)